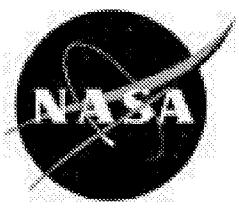
NASA/SP—2000-7011/SUPPL505
October 2000

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



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Typical Report Citation and Abstract

❶ 19970001126 NASA Langley Research Center, Hampton, VA USA
❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
❹ Mar. 1996; 130p; In English
❺ Contract(s)/Grant(s): RTOP 505-68-70-04
❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10' to 50', and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65' swept forebody serrations tended to roll together, while vortices from 40' swept serrations were more effective in generating additional lift caused by their more independent nature.
❽ Author
❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 505)

OCTOBER 2000

51
LIFE SCIENCES (GENERAL)

Includes general research topics related to plant and animal biology (non–human); ecology; microbiology; and also the origin, development, structure, and maintenance, of animals and plants in space and related environmental conditions. For specific topics in life sciences see categories 52 through 55.

20000095620 Naval Health Research Center, Toxicology Detachment, Wright-Patterson AFB, OH USA

Airway Reactivity Response to Advanced Composite Material (ACM) Combustion Atmospheres: B2-ACM, *Mar. 1998 - Mar. 2000*

Kimmel, Edgar C.; Reboulet, James E.; Courson, David L.; Whitehead, Gregory S.; Still, Kenneth R.; Mar. 2000; 83p; In English

Report No.(s): AD-A380781; NHRC/TD-TOXDET-00-02; No Copyright; Avail: CASI; A01, Microfiche; A05, Hardcopy

Exposure for 30 minutes to diluted smoke from pyrolysis of advanced composite material used in the construction of the B2 bomber (B2-ACM) caused an airway reactivity (AR) response in naive guinea pigs reminiscent of a human asthmatic episode. Animals exposed to diluted smoke from pyrolysis of 5, 10 and 100 grams of B2-ACM showed changes in a number of parameters characterizing ventilation, breathing pattern, and breath structure. These changes are considered indicative of bronchoconstriction. The highest exposure concentration also elicited convulsions in the animals, which may or may not be related to the AR response. Upon treatment with fresh air there was recovery period in which breathing returned to normal. However the recovery was transient with respiratory parameters returning to abnormal levels; indicating a "rebound" constrictive event even in the presence of clean air. Animals exposed to diluted smoke from the pyrolysis of 2 grams of B2-ACM demonstrated minimal changes in only a few of the respiratory parameters, suggesting that there might be a threshold for B2-ACM smoke elicited AR response.

DTIC

Air Quality; Reactivity; Combustion; Air Pollution

20000095936 Scripps Institution of Oceanography, La Jolla, CA USA

UV-Visible Spectroscopic Method and Models for Assessment and Monitoring of Harmful Algal Blooms *Final Report*

Mitchell, B. Greg, Scripps Institution of Oceanography, USA; [2000]; 23p; In English

Contract(s)/Grant(s): NAG5-8170; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The development of an enhanced predictive and early warning capability for the occurrence and impact of harmful algal blooms (HABs) would be of great benefit to coastal communities. A critical issue for early detection and monitoring of HABs is the need to detect harmful algal species within a mixed-species phytoplankton assemblage. Possession of UV-absorbing compounds called mycosporine-like amino acids (MAAs) may be one factor that allows HAB species to out-compete their phytoplankton neighbors. Possession of MAAs, which we believe can be inferred from strong UV-absorption signals in phytoplankton absorption coefficients, can be used as a flag for potential HAB outbreak. The goal of this project was to develop a solar simulating UV-visible incubator to grow HAB dinoflagellates, to begin MAA analysis of samples collected on global cruises, and to carry out initial experiments on HAB dinoflagellate species in pure culture. Our scientific objectives are to quantify MAA production and spectral induction mechanisms in HAB species, to characterize spectral absorption of MAAs, and to define the ecological benefit of MAAs (i.e. photoprotection). Data collected on cruises to the global oceans will be used to parameterize phytoplankton absorption in the UV region, and this parameterization could be incorporated into existing models of seawater optical properties in the UV spectral region. Data collected in this project were used for graduate fellowship applications by Elizabeth Frame. She has been awarded an EPA STAR fellowship to continue the work initiated by this project.

Author

Ultraviolet Absorption; Ultraviolet Spectra; Ultraviolet Emission; Visible Spectrum; Ultraviolet Spectroscopy; Spectroscopic Analysis

20000096218 NASA Johnson Space Center, Houston, TX USA

Microbial Impact on Success of Human Exploration Missions

Pierson, Duane L., NASA Johnson Space Center, USA; Ott, C. Mark, NASA Johnson Space Center, USA; Groves, T. O., NASA Johnson Space Center, USA; [2000]; 1p; In English, May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; Avail: Issuing Activity; Abstract Only

The purpose of this study is to identify microbiological risks associated with space exploration and identify potential countermeasures available. Identification of microbial risks associated with space habitation requires knowledge of the sources and expected types of microbial agents. Crew data along with environmental data from water, surfaces, air, and free condensate are utilized in risk examination. Data from terrestrial models are also used. Microbial risks to crew health include bacteria, fungi, protozoa, and viruses. Adverse effects of microbes include: infections, allergic reactions, toxin production, release of volatiles, food spoilage, plant disease, material degradation, and environmental contamination. Risk is difficult to assess because of unknown potential changes in microbes (e.g., mutation) and the human host (e.g., immune changes). Prevention of adverse microbial impacts is preferred over remediation. Preventative measures include engineering measures (e.g., air filtration), crew microbial screening, acceptability standards, and active verification by onboard monitoring. Microbiological agents are important risks to human health and performance during space flight and risks increase with mission duration. Acceptable risk level must be defined. Prevention must be given high priority. Careful screening of crewmembers and payloads is an important element of any risk mitigation plan. Improved quantitation of microbiological risks is a high priority.
Derived from text

Microbiology; Microorganisms; Risk; Health; Human Performance

20000096496 NASA Johnson Space Center, Houston, TX USA

Wheat Response to Differences In Water and Nutritional Status Between Zeoponic and Hydroponic Growth Systems

Steinberg, Susan L., NASA Johnson Space Center, USA; Ming, Douglas W., NASA Johnson Space Center, USA; Henderson, Keith E., NASA Johnson Space Center, USA; Carrier, Chris, NASA Johnson Space Center, USA; Gruener, John E., NASA Johnson Space Center, USA; Barta, Dan J., NASA Johnson Space Center, USA; Henninger, Don L., NASA Johnson Space Center, USA; [1999]; 2p; In English
Contract(s)/Grant(s): RTOP 131-50-20-23; Avail: Issuing Activity; Abstract Only

Hydroponic culture has traditionally been used for controlled environment life support systems (CELSS) because the optimal environment for roots supports high growth rates. Recent developments in zeoponic substrate and microporous tube irrigation (ZPT) also offer high control of the root environment. This study compared the effect of differences in water and nutrient status of ZPT or hydroponic culture on growth and yield of wheat (Triticum aestivum L., CV 'USU-Apogee'). In a side-by-side test in a controlled environment, wheat was grown in ZPT and recirculating hydroponics to maturity. Water use by plants grown in both culture systems peaked at 15-20 L per square meters per d up to day 40, after which it declined more rapidly for plants grown in ZPT culture due to earlier senescence of leaves. No consistent differences were noted in water status between plants grown in the two culture systems. Although yield was similar, harvest index was 28% lower for plants grown in ZPT versus hydroponic culture. Sterile green tillers made up 12% and 0% of the biomass of plants grown in ZPT and hydroponic culture, respectively. Differences in biomass partitioning were attributed primarily to NH4 -N nutrition of plants grown in ZPT as compared with NO3-N in hydroponic nutrient solution. It was likely that NH4-N induced Ca deficiency produced excess tillering and lower harvest index for plants grown in ZPT culture. These results suggest that further refinements in zeoponic substrate would make ZPT culture a viable alternative for achieving high productivity in a CELSS.
Author

Hydroponics; Nutrition; Water; Wheat; Crop Growth; Closed Ecological Systems; Zeolites

20000096506 Civil Aeromedical Inst., Oklahoma City, OK USA

Distribution of Butalbital in Biological Fluids and Tissues ***Final Report***

lewis, Russel J., Civil Aeromedical Inst., USA; Southern, Travis L., Civil Aeromedical Inst., USA; Canfield, Dennis V., Civil Aeromedical Inst., USA; August 2000; 8p; In English
Contract(s)/Grant(s): AM-B-00-TOX-202
Report No.(s): DOT/FAA/AM-00/29; Avail: CASI; A02, Hardcopy; A01, Microfiche

During the investigation of fatal aviation accidents, postmortem samples from the pilot/copilot are submitted to the Federal Aviation Administration's (FAA's) Civil Aeromedical Institute for toxicological analysis. Blood specimens are received in approximately 70% of the fatal aviation accidents analyzed by the FAA's Toxicology and Accident Research Laboratory. The lack of blood available is usually due to the severe damage to a pilot's body during an aviation accident and/or to the length of time taken to recover the body following an accident. Therapeutic and toxic levels for most drugs are reported in the scientific literature

for blood and plasma only. Therefore, it is imperative for an accident investigator and forensic toxicologist to be able to estimate drug concentrations in a fatal aviation accident victim's blood from the available concentrations in the tissue. This is exemplified by a recent aviation fatality where butalbital was identified in muscle tissue of a pilot, and the investigators wanted to know the approximate butalbital concentration expected in the victim's blood. Butalbital, a short-acting barbiturate found in combination with other drugs such as acetaminophen, aspirin, codeine, and caffeine, is commonly prescribed for the treatment of tension headaches. Certain side effects of butalbital, such as drowsiness, sedation, dizziness, and a feeling of intoxication, could affect pilot performance and become a significant factor in an aviation accident. Thus, our laboratory determined the distribution of butalbital ill various postmortem tissues and fluids. The distribution coefficients established for butalbital, expressed as specimen/blood ratios, were found to be as follows: muscle (0.66 +/- 0.09), kidney (0.98 +/- 0.09), lung (0.87 +/- 0.06), spleen (0.75, +/- 0.03), brain (0.96 +/- 0.07), liver (2.22 +/- 0.04), liver fluid (0.89 +/- 0.23), heart (0.91 +/- 0.17), bile (0.94 +/- 0.22), and urine (0.73, +/- 0.16). The results demonstrate that muscle, kidney, lung, spleen, brain, liver, and heart can be used reliably to estimate butalbital blood concentrations.
Author
Aircraft Accident Investigation; Aircraft Pilots; Blood Plasma; Body Fluids; Brain; Damage; Intoxication; Physiological Effects; Pilot Performance; Sensory Feedback

20000097590 Indira Gandhi Centre for Atomic Research, Kalpakkam, India
Chromosome aberration analysis for biological dosimetry: a review
Paul, S. F. D.; Venkatachalam, P.; Jeevanram, R. K.; Dec. 31, 1996; 67p; In English
Report No.(s): DE98-618822; IGC-173; No Copyright; Avail: Department of Energy Information Bridge

Among various biological dosimetry techniques, dicentric chromosome aberration method appears to be the method of choice in analysing accidental radiation exposure in most of the laboratories. The major advantage of this method is its sensitivity as the number of dicentric chromosomes present in control population is too small and more importantly radiation induces mainly dicentric chromosome aberration among unstable aberration. This report brings out the historical development of various cytogenetic methods, the basic structure of DNA, chromosomes and different forms of chromosome aberrations. It also highlights the construction of dose-response curve for dicentric chromosome and its use in the estimation of radiation dose.
NTIS
Chromosomes; Aberration

20000097914 Finnish Centre for Radiation and Nuclear Safety, Helsinki, Finland
Past and future trends of radiation research
Lindell, B.; Boice, J. D.; Sinnaeve, J.; Rytoemaa, T.; Dec. 31, 1997; 75p; In English, 28 Feb. 1997, Helsinki, Finland
Report No.(s): DE97-639765; STUK-A-138; No Copyright; Avail: Department of Energy Information Bridge

The main topics of the seminar were: (1) Historical review of radiation research, (2) Radiation epidemiology in risk assessment, (3) Radiation research within the framework programmes of the European Commission, and (4) Future trends in radiobiology.
NTIS
Radiobiology; Radiation Protection; Radiation Effects; Conferences

20000098510 Research and Technology Organization, Human Factors and Medicine, Neuilly-sur-Seine, France
Officer Selection ***La Selection des Officiers***
Officer Selection; August 2000; 232p; In English, 9-11 Nov. 1999, Monterey, CA, USA; See also 20000098511 through 20000098541; CD-ROM contains full text document in PDF format
Report No.(s): RTO-MP-55; AC/323(HFM)TP/27; ISBN 92-837-0016-3; Copyright Waived; Avail: CASI; A11, Hardcopy; A03, Microfiche; C01, CD-ROM

The Human Factors and Medicine (HFM) Panel held a workshop on "Officer Selection" at the Hilton Hotel in Monterey, California, USA, 9th - 11th November 1999. The theme of this workshop, officer selection, is an issue of central importance to the military forces of all countries, since it determines which individuals, with what characteristics, will be available to lead the forces in the future. Thirty-three workshop papers were presented by representatives from: Austria, Belgium, Canada, the Czech Republic, Denmark, France, Germany, Italy, The Netherlands, Poland, Singapore, Sweden, Switzerland, Turkey, Ukraine, the UK, and the USA. The workshop provided an opportunity for cross-fertilization of ideas between military and civilian personnel managers and researchers across many professional disciplines.
Author
Personnel Selection; Armed Forces; Personnel Management

20000099680 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

A Numerical Study of the Effect of Periodic Nutrient Supply on Pathways of Carbon in a Coastal Upwelling Regime

Carr, Mary–Elena, Jet Propulsion Lab., California Inst. of Tech., USA; Journal of Plankton Research; 1998; Volume 20, No. 3, pp. 491-516; In English; Copyright; Avail: Issuing Activity

A size-based ecosystem model was modified to include periodic upwelling events and used to evaluate the effect of episodic nutrient supply on the standing stock, carbon uptake, and carbon flow into mesozooplankton grazing and sinking flux in a coastal upwelling regime. Two ecosystem configurations were compared: a single food chain made up of net phytoplankton and mesozooplankton (one autotroph and one heterotroph, A1H1), and three interconnected food chains plus bacteria (three autotrophs and four heterotrophs, A3H4). The carbon pathways in the A1H1 simulations were under stronger physical control than those of the A3H4 runs, where the small size classes are not affected by frequent upwelling events. In the more complex food web simulations, the microbial pathway determines the total carbon uptake and grazing rates, and regenerated nitrogen accounts for more than half of the total primary production for periods of 20 days or longer between events. by contrast, new production, export of carbon through sinking and mesozooplankton grazing are more important in the A1H1 simulations. In the A3H4 simulations, the turnover time scale of the autotroph biomass increases as the period between upwelling events increases, because of the larger contribution of slow-growing net phytoplankton. The upwelling period was characterized for three upwelling sites from the alongshore wind speed measured by the NASA Scatterometer (NSCAT) and the corresponding model output compared with literature data. This validation exercise for three upwelling sites and a downstream embayment suggests that standing stock, carbon uptake and size fractionation were best supported by the A3H4 simulations, while the simulated sinking fluxes are not distinguishable in the two configurations.

Author

Ecosystems; Environment Models; Carbon; Upwelling Water; Coasts; Coastal Ecology; Coastal Water; Environment Effects

20000101070 NASA Johnson Space Center, Houston, TX USA

T Cell Activation Thresholds are Affected by Gravitational

Adams, Charley, NASA Johnson Space Center, USA; Gonzalez, M., NASA Johnson Space Center, USA; Nelman–Gonzalez, M., NASA Johnson Space Center, USA; [1999]; 1p; In English; 28th; 28th Annual Autumn Immunology Conference, 19-21 Nov. 1999, Chicago, IL, USA; No Copyright; Avail: Issuing Activity; Abstract Only

T cells stimulated in space flight by various mitogenic signals show a dramatic reduction in proliferation and expression of early activation markers. Similar results are also obtained in a ground based model of microgravity, clinorotation, which provides a vector-averaged reduction of the apparent gravity on cells without significant shear force. Here we demonstrate that T cell inhibition is due to an increase in the required threshold for activation. Dose response curves indicate that cells activated during clinorotation require higher stimulation to achieve the same level of activation, as measured by CD69 expression. Interleukin 2 receptor expression, and DNA synthesis. The amount of stimulation necessary for 50% activation is 5 fold in the clinostat relative to static. Correlation of TCR internalization with activation also exhibit a dramatic right shift in clinorotation, demonstrating unequivocally that signal transduction mechanism independent of TCR triggering account for the increased activation threshold. Previous results from space flight experiments are consistent with the dose response curves obtained for clinorotation. Activation thresholds are important aspects of T cell memory, autoimmunity and tolerance Clinorotation is a useful, noninvasive tool for the study of cellular and biochemical event regulating T cell activation threshold and the effects of gravitation forces on these systems.

Author

Dosage; Genetics; Gravitational Effects; Immune Systems; Spaceborne Experiments; Cells (Biology)

20000103033 Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

Application of total reflection x-ray fluorescence analysis in biomedical field

Zhao, Limin; Dec. 31, 1997; 6p; In English

Report No.(s): DE98-622592; IC/IR-97/36; No Copyright; Avail: Department of Energy Information Bridge

Total reflection X-ray fluorescence analysis applied in biomedical field is provided here. Two standard reference of pig liver are used to verify the errors in this experiment. The minimum detection limit is determined. With this method, small intestine cells of normal and radiated small white mice are analyzed. The results indicate that the content of trace elements for both mice is clearly different, which could be used to provide valuable clues for biomedical medicine.

NTIS

X Ray Fluorescence; Optical Reflection

20000103976 Association of American Medical Colleges, Div. of Biomedical and Health Sciences Research, Washington, DC USA

Maximizing the Investment: Principles to Guide the Federal-Academic Partnership in Biomedical and Health Sciences Research

Mar. 1998; 42p; In English; Original contains color illustrations

Report No.(s): PB2000-107761; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To exploit fully the opportunities presented by the new frontiers of medicine, members of Congress and the Administration have recently proposed major increases in the nation's investment in biomedical research, some calling for doubling the budget of the National Institutes of Health (NIH) over five years. Others in Congress have proposed corresponding increases in support of the National Science Foundation (NSF) and other federal science programs to promote U.S. economic competitiveness. Congress may act this year to increase significantly appropriations for federal research, thanks to continued U.S. economic growth and the decline in the federal budget deficit. The Administration has already requested budgetary increases of 8.4 percent for the NIH and 10 percent for the NSF in FY 1999. The Ad Hoc Group for Medical Research Funding, a diverse coalition of nearly 200 patient and voluntary health groups, medical and scientific societies, and academic and research organizations, including the Association of American Medical Colleges (AAMC), has called upon Congress to increase the NIH budget by 15 percent in FY 1999 as a first step toward the goal of doubling the investment in NIH over the next five years.

NTIS

Federal Budgets; Health; Medical Science; Research Management

20000103980 New Energy and Industrial Technology Development Organization, Tokyo, Japan

Report of the results of the fiscal 1997 regional consortium R and D project. Regional consortium field / Development of 3D high speed bio-micromanipulation system (first fiscal year)

Mar. 31, 1998; 129p; In Japanese; In English

Report No.(s): DE99-746849; ETDE/JP-99746849; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

This is aimed at developing a 3D high speed bio-micromanipulation system for small objects such as cells, bacteria and DNA. In fiscal 1997, a common platform for putting together and integrating individual technology owned by each member is trially fabricated, and the R and D of element technology to be integrated to it is divided up among members. As to selection/transportation technology, a basic experiment on screening by laser beams and electric field is conducted, and microfluid chips isolating bacteria are fabricated. Concerning positioning/fixation technology, cells and others which are comparatively larger than bacteria are freely positioned, and microdevices for fixation are trially fabricated. Relating to power measuring/controlling technology, developed is a multi-freedom degree contact type micromanipulator and a multi-axial minute sensor which enables the 3D mechanical manipulation of cells of the above-mentioned size, etc. The minute processing technology is developed to trially fabricate various microdevices which are integrated into the common flatform.

NTIS

Manipulators; Biotechnology

52
AEROSPACE MEDICINE

Includes the biological and physiological effects of atmospheric and space flight (weightlessness, space radiation, acceleration, and altitude stress) on the human being; and the prevention of adverse effects on those environments. For psychological and behavioral effects of aerospace environments see 53 Behavioral Science. For the effects of space on animals and plants see 51 Life Sciences.

20000094444 Miami Univ., School of Medicine, FL USA

Therapeutic Hypothermia Following Traumatic Spinal Injury Morphological and Functional Correlates ***Annual Report, 2 Dec. 1998 - 2 Dec. 1999***

Yezierski, Robert P.; Jan. 2000; 78p; In English

Contract(s)/Grant(s): DAMD17-97-1-7010

Report No.(s): AD-A380236; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The primary objective of experiments carried out during the third year focused on determining the behavioral and morphological effects of systemic hyperthermia following moderate spinal cord injury. In these experiments moderate hyperthermia (39.5-40.0 C) was initiated 30 minutes post-injury for a period of four hours. Two days post-injury we initiated the behavioral assessment of locomotor function. In anticipation of future therapeutic applications of combined hypothermia and pharmacological treatment protocols, a second purpose of experiments during the third year was to complete our evaluation of

the effects of the NMDA antagonist and inhibitor of nitric oxide synthase inhibitor agmatine on morphological and behavioral outcome measures following traumatic spinal cord injury. The major findings of these studies have shown that significant differences are observed in the behavioral and morphological assessment scores of animals undergoing hyperthermia compared to animals receiving normothermic treatment. Similarly, significant differences were observed following systemic administration of agmatine for 14 days post-injury. Overall, the results support the original hypothesis of this proposal that whole body hyperthermia is capable of producing detrimental effects on functional recovery following traumatic spinal cord injury. Future studies to be carried out during the no cost extension year include evaluating the effects of long term (8 hours) hypothermia on behavioral outcome measures, an evaluation of combination therapy involving hypothermia and the anti- inflammatory cytokine IL- 10, and an evaluation of the physiological basis of functional recovery following systemic hypothermia.
DTIC
Hyperthermia; Spinal Cord; Physiology; Pharmacology; Hypothermia; Back Injuries

20000094518 NASA Johnson Space Center, Houston, TX USA
Statistical Analysis of Risk Factors in the Prebreathe Reduction Protocol
Gerth, Wayne A., Duke Univ., USA; Gernhardt, Michael L., NASA Johnson Space Center, USA; Conkin, Johnny, National Space Biomedical Research Inst., USA; [2000]; 1p; In English, 14-18 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The 165 exposures from four 2-hour protocols were analyzed for correlations or trends between decompression sickness (DCS) or venous gas emboli (VGE), and variables that affect risk in the subject and astronaut populations. The assumption in this global survey is that the distributions of gender, age, body mass index, etc., are equally represented in all four tested procedures. We used Student t-test for comparisons between means and chi-square test between comparisons of proportions with pis less than 0.05 defining a significant level. The type and distribution of the 19 cases of DCS were similar to historical cases. There was no correlation of age, gender, body mass index or fitness level with greater incidence of DCS or VGE. However increased age was associated with more Grade IV VGE in males. The duration and quantity of exercise during prebreathe is inversely related to risk of DCS and VGE. The latency time for VGE was longer (103 min +/- 56 SD, n = 15) when the ergometry was done approximately 15 min into the prebreathe than when done at the start of the prebreathe (53 min +/- 31, n = 13). The order of the ergometry did not influence the overall DCS and VGE incidence. We identified variables other than those of the prebreathe procedures that influence the DCS and VGE outcome. The analysis suggests that males over 40 years have a high incidence of Grade IV VGE.
Author
Aeroembolism; Decompression Sickness; Statistical Analysis; Breathing; Respiration

20000094523 NASA Johnson Space Center, Houston, TX USA
Inflight Exercise Regimen for the 2-Hour Prebreathe Protocol
Foster, Philip P., National Space Biomedical Research Inst., USA; Gernhardt, Michael L., NASA Johnson Space Center, USA; Woodruff, Kristin K., Wyle Labs., Inc., USA; Schneider, Susan M., NASA Johnson Space Center, USA; [2000]; 1p; In English, 14-18 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; No Copyright; Avail: Issuing Activity; Abstract Only

A 10 min aerobic prebreathe exercise up to 75% V-O2(sub max) on a dual-cycle ergometer, included in the 2-hour prebreathe protocol, has been shown to dramatically reduce the incidence of decompression sickness (DCS) at altitude. In-flight only leg ergometry will be available. A balanced exercise was developed using surgical tubing with the ergometer on-orbit. We hypothesize that a 75% V02max workload, individually prescribed, would be achieved using a target heart rate to regulate the intensity of the arm exercise. VO2, heart rate (HR) / ECG, V-CO2 /V-O2, V(sub E), and V(sub T), and rate of perceived exertion (Borg scale) were measured in eleven healthy subjects who passed a US Air Force Class III Physical examination. A V-O2 peak test was performed to assess the sub-maximal exercise prescription. Two series of sub-maximal tests were performed: (1) leg ergometer/hand ergometer and (2) leg ergometer/surgical tubes. We found no significant differences (P is greater than 0.05) in comparing the means for V-O2 and HR between the predicted and measured values during the final 4 minute-stage at "75% V-O2 workload" or between the two types of sub-maximal tests. The prescribed prebreathe sub-maximal exercise performed with flight certified surgical tubes was achieved using the target HR.
Author
Decompression Sickness; Heart Rate; Physical Exercise; High Altitude Breathing

20000094524 NASA Johnson Space Center, Houston, TX USA

Clinical Space Medicine Panel

Baisden, Denise L., NASA Johnson Space Center, USA; [2000]; 1p; In English, 14-28 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA

Report No.(s): ASMA-A-001674-ASMA; No Copyright; Avail: Issuing Activity; Abstract Only

The practice of space medicine is diverse. It includes routine preventive medical care of astronauts and pilots, the development of inflight medical capability and training of flight crews as well as the preflight, inflight, and postflight medical assessment and monitoring. The Johnson Space Center Medical Operations Branch is a leader in the practice of space medicine. The papers presented in this panel will demonstrate some of the unique aspects of space medicine.

Author

Aerospace Medicine; Clinical Medicine; Education

20000094536 NASA Johnson Space Center, Houston, TX USA

Operational Implementation of a 2-Hour Prebreathe Protocol for International Space Station

Waligora, James M., Waligora (James M.), USA; Conkin, J., Baylor Coll. of Medicine, USA; Foster, P. P., Baylor Coll. of Medicine, USA; Schneider, S., NASA Johnson Space Center, USA; Loftin, Karin C., Wyle Labs., Inc., USA; Gernhardt, Michael L., NASA Johnson Space Center, USA; Vann, R., Duke Univ., USA; [2000]; 1p; In English, 14-18 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Procedures, equipment, and analytical techniques were developed to implement the ground tested 2-hour protocol in-flight operations. The methods are: 1) The flight protocol incorporates additional safety margin over the ground tested protocol. This includes up to 20 min of additional time on enriched O2 during suit purge and pressure check, increased duration of extravehicular activity (EVA) preparation exercise during O2 prebreathing (up to 90 min vs; the tested 24 min), and reduced rates of depressurization. The ground test observations were combined with model projections of the conservative measures (using statistical models from Duke University and NASA JSQ to bound the risk of Type I and Type II decompression sickness (DCS). 2) An inflight exercise device using the in-flight ergometer and elastic tubes for upper body exercise was developed to replicate the dual cycle exercise in the ground trials. 3) A new in-flight breathing system was developed and man-tested. 4) A process to monitor inflight experience with the protocol, including the use of an in-suit Doppler bubble monitor when available, was developed. The results are: 1) The model projections of the conservative factors of the operational protocol were shown to reduce the risk of DCS to levels consistent with the observations of no DCS to date in the shuttle program. 2) Cross over trials of the dual cycle ergometer used in ground tests and the in-flight exercise system verified that02consumption and the % division of work between upper and lower body was not significantly different at the p= 0.05 level. 3) The in-flight breathing system was demonstrated to support work rates generating 75% O2(max) in 95 percentile subjects. 4) An in-flight monitoring plan with acceptance criteria was put in place for the 2-hour prebreathe protocol. and the conclusions are: The 2-hour protocol has been approved for flight, and all implementation efforts are in place to allow use of the protocol as early as flight ISS 7A, now scheduled in November of 2000.

Author

Ground Tests; Protocol (Computers); Physical Exercise; Mathematical Models; In-Flight Monitoring; Decompression Sickness; Acceptability

20000095078 NASA Johnson Space Center, Houston, TX USA

Integrated Evaluation of Latent Viral Reactivation During Spaceflight

Pierson, Duane L., NASA Johnson Space Center, USA; [2000]; 27p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This application proposes a continuation of our current effort, which has provided the first demonstration of viral reactivation during space flight. We have used the herpesvirus EBV as a model for latent viral reactivation and have shown that increased amounts of EBV DNA were shed by astronauts during space flight. Analysis of the Antarctic space flight analog indicated that the frequency of viral shedding may also increase (along with the increased numbers of virus) during long periods of isolation. However, a number of critical questions remain before the findings may be considered a significant health risk during extended space flight. These include: Are other latent viruses (e.g., other herpesviruses and polyornaviruses) in addition to EBV also reactivated and shed more frequently and/or in higher numbers during space flight? Is the viral reactivation observed in space flight and ground-based analogs mediated through the hypothalamus-pituitary-adrenal (HPA) axis resulting in a decreased cell-mediated immune response? How does detection of viral DNA by PCR analysis correlate with infectious virus? How does the amount of virus found during flight compare with viral levels observed in acute/chronic viral illnesses and in control individuals? This expanded study will examine the phenomenon of viral reactivation from the initiating stress through the HPA

axis with the accompanying suppression of the immune system resulting in viral reactivation. This information is essential to determine if latent viral reactivation among crewmembers represents a sufficient medical risk to space travel to require the development of suitable countermeasures.
Derived from text
Viruses; Aerospace Medicine; Long Duration Space Flight; Space Flight Stress

20000095935 NASA Johnson Space Center, Houston, TX USA
A Mathematical Model of Diffusion-Limited Gas Bubble Dynamics in Tissue with Varying Diffusion Region Thickness
Srinivasan, R. Srini, Wyle Labs., Inc., USA; Gerth, Wayne A., Duke Univ., USA; Powell, Michael R., NASA Johnson Space Center, USA; [2000]; 3p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

A three-region mathematical model of gas bubble dynamics has been shown suitable for describing diffusion-limited dynamics of more than one bubble in a given volume of extravascular tissue. The model is based on the dynamics of gas exchange between a bubble and a well-stirred tissue region through an intervening unperfused diffusion region previously assumed to have constant thickness and uniform gas diffusivity. As a result, the gas content of the diffusion region remains constant as the volume of the region increases with bubble growth, causing dissolved gas in the region to violate Henry's law. Earlier work also neglected the relationship between the varying diffusion region volume and the fixed total tissue volume, because only cases in which the diffusion region volume is a small fraction of the overall tissue volume were considered. We herein extend the three-region model to correct these theoretical inconsistencies by allowing both the thickness and gas content of the diffusion region to vary during bubble evolution. A postulated difference in gas diffusivity between an infinitesimally thin layer at the bubble surface and the remainder of the diffusion region leads to variation in diffusion region gas content and thickness during bubble growth and resolution. This variable thickness, differential diffusivity (VTDD) model can yield bubble lifetimes considerably longer than those yielded by earlier three-region models for given model and decompression parameters, and meets a need for theoretically consistent but relatively simple bubble dynamics models for use in studies of decompression sickness (DCS) in human subjects,
Keywords: decompression sickness, gas diffusion in tissue, diffusivity
Author
Bubbles; Decompression Sickness; Diffusion; Diffusivity; Dissolved Gases; Gas Dynamics; Mathematical Models

20000096262 Maryland Univ., Baltimore, MD USA
Effects of Endurance and Resistance Training on Cardiovascular Risk in Military Eligible Women *Annual Report, 25 Sep. 1998-24 Sep. 1999*
Gardner, Andrew W.; Poehlman, Eric T.; Oct. 1999; 95p; In English
Contract(s)/Grant(s): DAMD17-96-1-6299
Report No.(s): AD-A378683; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The overall hypothesis is that the decline in physical activity habits and resultant increase in body fat reduces exercise capacity and muscle mass in military women. These lifestyle changes worsen cardiovascular risk factors. Therefore, continued involvement in resistance and endurance exercise programs which increases or preserves fat free mass, as well as enhances physical activity will prevent functional declines in military-eligible women. Although exercise is frequently recommended to enhance overall fitness, it is unclear as to whether endurance or resistance exercise is more effective in attenuating functional and cardiovascular declines in women. We will systematically compare the effects of endurance and resistance exercise on physical activity, cardiovascular fitness, and fat metabolism in military eligible women. To accomplish this objective, women (18 to 35 yrs) will be randomized to a 6-month endurance training, resistance training or a control group. We will examine the following dependant variables: (1) free-living physical activity using doubly labeled water and indirect calorimetry; (2) body composition and body fat distribution on using dual energy x-ray absorptiometry and computerized tomography, (3) in-vivo fat oxidation from C-13 palmitate; and (4) insulin sensitivity from hyperglycemic/euglycemic clamps. Our results will provide new information on the energetic and physiological effects of endurance and resistance training on energy metabolism, cardiovascular fitness and fuel utilization in women.
DTIC
Cardiovascular System; Physical Exercise; Endurance; Adipose Tissues; Females

20000096495 NASA Johnson Space Center, Houston, TX USA
Integrated Testing Regimen: Assessment of Countermeasures for Long Duration Space Flight
Sams, Clarence F., NASA Johnson Space Center, USA; [2000]; 1p; In English, 14-18 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Space flight has been shown to induce changes in the physiology of crewmembers which can adversely affect their performance. The objectives of Countermeasures Evaluation and Validation Project (CEVP) are to develop and validate potential countermeasures to the deleterious effects of space flight for operational implementation and use. In order to accomplish this objective, a group of standardized tests, the Integrated Testing Regimen or ITR, will be utilized for the evaluation of candidate countermeasures. Additionally, the ITR will illuminate intersystem effects of the potential countermeasures and provide normative values for the physiological responses. Due to the small number of crewmembers available as test subjects, statistically rigorous validation of countermeasures presents a challenging problem. Strategies for reliable evaluation of small N clinical studies will be utilized for these activities. These approaches will permit effective analysis of promising countermeasure to support human space flights of increasing duration.
Author
Countermeasures; Long Duration Space Flight; Aerospace Medicine; Evaluation

20000096522 NASA Johnson Space Center, Houston, TX USA
NASA Countermeasures Evaluation and Validation Project
Lundquist, Charlie M., NASA Johnson Space Center, USA; [2000]; 1p; In English, 14-18 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; No Copyright; Avail: Issuing Activity; Abstract Only

To support its ISS and exploration class mission objectives, NASA has developed a Countermeasure Evaluation and Validation Project (CEVP). The goal of this project is to evaluate and validate the optimal complement of countermeasures required to maintain astronaut health, safety, and functional ability during and after short- and long-duration space flight missions. The CEVP is the final element of the process in which ideas and concepts emerging from basic research evolve into operational countermeasures. The CEVP is accomplishing these objectives by conducting operational/clinical research to evaluate and validate countermeasures to mitigate these maladaptive responses. Evaluation is accomplished by testing in space flight analog facilities, and validation is accomplished by space flight testing. Both will utilize a standardized complement of integrated physiological and psychological tests, termed the Integrated Testing Regimen (ITR) to examine candidate countermeasure efficacy and intersystem effects. The CEVP emphasis is currently placed on validating the initial complement of ISS countermeasures targeting bone, muscle, and aerobic fitness; followed by countermeasures for neurological, psychological, immunological, nutrition and metabolism, and radiation risks associated with space flight. This presentation will review the processes, plans, and procedures that will enable CEVP to play a vital role in transitioning promising research results into operational countermeasures necessary to maintain crew health and performance during long duration space flight.
Author
Countermeasures; NASA Programs; Long Duration Space Flight; International Space Station; Aerospace Medicine

20000097912 Commissariat a l'Energie Atomique, Dept. de Protection de la Sante de l'Homme et de Dosimetrie, Fontenay-aux-Roses, France
Adsorption process analysis at the solid-gas interface by the polarization phenomenon study
Mouton–Chazel, V.; Oct. 05, 1994; 221p; In French; In English
Report No.(s): DE97-639825; FRCEA-TH-581; No Copyright; Avail: Department of Energy Information Bridge

In order to improve the safety of anti-gas filters users, the Cogema (Nuclear Materials General Company) has developed a gaseous pollutants saturation detection technology for respiratory protection masks. As a matter of fact, the problem consists in studying the surface properties of a solid. In this study the adsorption has been considered as a phenomenon which can be followed by a relatively simple electrical measure technology. A microscopic description of the adsorption phenomenon has been given at first and explained by the thermodynamics laws. Then a theoretical model has been elaborated. The developments which have been brought to this model in this work have allowed to give a satisfactory interpretation of the phenomena observed during the adsorption of a polar gas on a zeolite.
NTIS
Adsorption; Detection; Aerospace Medicine; Protective Clothing

20000098516 Swedish Defence Research Establishment, Stockholm, Sweden
Predictions from Physical Fitness Tests Impact of Age and Gender
Bergh, U., Swedish Defence Research Establishment, Sweden; Danielson, U., Swedish Defence Research Establishment, Sweden; Officer Selection; August 2000, pp. 6-1 - 6-5; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

Physical fitness tests are employed in most armed forces; the purpose being to avoid persons with insufficient fitness. The predictive value is strongly influenced by the prevalence of the tested quality. In regard to physical work capacity, higher values

are more prevalent among males compared to females and among younger people compared to older ones. At a prevalence of .9 for males and .4 for females, the success rate among those who passes the test would theoretically be 95% and 70%, respectively. Prevalence should be included when predicting the possible outcome of different tests. This theoretical example is in line with empirical findings. For example, among fire-fighters who had passed a treadmill test, the success rate in a smoke-diving task was 90% in age group 20-30 years, 78% in age group 3l-40 years, 69% in age group 41-50 years, and 30% in age group 51-60 years. Author

Armed Forces; Age Factor; Physical Fitness; Human Performance; Performance Prediction; Qualifications; Sex Factor; Abilities

20000098591 NASA Langley Research Center, Hampton, VA USA

Aerospace Medicine and Biology: A Continuing Bibliography with Indexes, Supplement 504

September 2000; 62p; In English

Report No.(s): NASA/SP-2000-7011/SUPPL504; NAS 1.21:7011/SUPPL504; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This supplemental issue of Aerospace Medicine and Biology, A Continuing Bibliography with Indexes (NASA/SP-2000-7011) lists reports, articles, and other documents recently announced in the NASA STI Database. In its subject coverage, Aerospace Medicine and Biology concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion. Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract. Two indexes- subject and author are included after the abstract section.

CASI

Aerospace Medicine; Bibliographies; Exobiology; Indexes (Documentation); Biological Effects; Bioastronautics

20000099693 Texas Univ. Health Science Center, Dept. of Ophthalmology, San Antonio, TX USA

Mechanisms of Photo-Oxidative Stress in Retinal Pigment Epithelium: Is Melanin a Photosensitizer? ***Final Report, 15 Apr. 1995 - 14 Apr. 1998***

Glickman, Randolph D.; Jul. 14, 1998; 27p; In English

Contract(s)/Grant(s): F49620-95-1-0332; AF Proj. 2312

Report No.(s): AD-A380907; UTHSCSA-OPH-98-03; AFRL-SR-BL-TR-00-0376; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The cellular pigments of the retinal pigment epithelium (RPE) have been shown to catalyze free radical activity, especially when illuminated with visible or ultraviolet light. This activity is sufficient to cause photooxidation of several major cellular components, including proteins, fatty acids, as well as antioxidants, and other small molecules. Similar reactivity of melanin granules has been demonstrated in intact RPE cells by the use of fluorescent oxidation-sensitive vital probes. Experiments have been conducted in cultures of bovine and baboon RPE cells exposed to quantum-equivalent, 488, 514.5 or 647.1 nm emissions from Argon and Krypton ion CW lasers. Based on fluorescence microscopy and biochemical analysis, the blue-green wavelengths, on a quantal basis, most efficiently induced photooxidative stress in the pigmented cells. The fluorescence signal after laser exposure, corresponding to areas of greatest oxidative stress, was restricted to the cells' cytoplasm. These findings indicate that the melanosomes of pigment cells are involved in intracellular photooxidative reactions, and indeed, may be considered as photosensitzers possibly contributing to light-induced, oxidative damage to ocular tissue.

DTIC

Retina; Eye (Anatomy); Antioxidants; Photosensitivity; Epithelium; Exposure; Free Radicals

20000101013 NASA Johnson Space Center, Houston, TX USA

Ethnic Differences in Physical Fitness, Blood Pressure and Blood Chemistry in Women (AGES 20-63)

Ayers, G. W., American Coll. of Sports Medicine, USA; Wier, L. T., American Coll. of Sports Medicine, USA; Jackson, A. S., American Coll. of Sports Medicine, USA; Stuteville, J. E., NASA Johnson Space Center, USA; [1999]; 1p; In English; 46th; 46th Annual Meeting, 2-5 Jun. 1999, Seattle, WA, USA; Sponsored by American Coll. of Sports Medicine, USA; No Copyright; Avail: Issuing Activity; Abstract Only

This study examined the role of ethnicity on the aerobic fitness, blood pressure, and selected blood chemistry values of women. One hundred twenty-four females (mean age 41.37 +/- 9.0) were medically Examined at the NASA/Johnson Space Center

occupational health clinic. Ethnic groups consisted of 23 Black (B), 18 Hispanic (H) and 83 Non-minority (NM). Each woman had a maximum Bruce treadmill stress test (RER greater than or = 1.1) and a negative ECG. Indirect calorimetry, skinfolds, self-report physical activity (NASA activity scale), seated blood pressure, and blood chemistry panel determined VO2max, percent fat, level of physical activity, blood pressure and blood chemistry values. ANOVA revealed that the groups did not differ (p greater than 0.05) in age, VO2 max, weight, percent fat, level of physical activity, total cholesterol, or HDL-C. However, significant differences (p greater than 0.05) were noted in BMI, diastolic blood pressure, and blood chemistries. BMI was 3.17 higher in H than in NM; resting diastolic pressures were 5.69 and 8.05 mmHg. lower in NM and H than in B; triglycerides were 48.07 and 37.21 mg/dl higher in H than in B and NM; hemoglobin was .814 gm/dl higher in NM than B; fasting blood sugar was 15.41 mg/dl higher in H than NM; The results of this study showed that ethnic groups differed in blood pressure and blood chemistry values but not aerobic fitness or physical activity. There was an ethnic difference in BMI but not percent fat.
Author
Blood Pressure; Chemical Composition; Cholesterol; Electrocardiography; Ethnic Factors; Females; Physical Fitness

20000101023 Naval Health Research Center, Aircrew Health and Performanmce Div., San Diego, CA USA
Orbscan Pachymetry: Implications of a Repeated Measures and Diurnal Variation Analysis *Final Report*
Kaupp, Sendor, Naval Medical Research Inst., USA; Lattimore, Morris R., Naval Health Research Center, USA; Schallhorn, Steven, Naval Medical Research Inst., USA; Lewis, Robert, Naval Medical Research Inst., USA; Ophthalmology; Oct. 01, 1999; Volume 106, No. 5, pp. 977-981; In English, December 1997, San Antonio, TX, USA; Sponsored by American Academy of Optometry, USA
Contract(s)/Grant(s): DA Proj. 301-62787-A-879
Report No.(s): AD-A371284; USAARL-2000-01; No Copyright; Avail: Issuing Activity

Corneal thickness changes reflect alterations in hydration and metabolism. Ultrasound pachymetry determinations may be adversely influenced by fluctuations in tissue hydration, whereas optical systems are apparently unaffected by these fluxes. A recently marketed, optical-based, topographic mapping system (Orbscan; Orbtek, Inc.) uses anterior and posterior corneal surface data to calculate corneal thickness. This new instrumentation presents as a potentially useful pachymetry tool for evaluation of corneas under hydration flux or challenge (e.g. postphotorefractive keratectomy [PRK] healing studies) and was therefore evaluated for accuracy and variability. Three calibrated standards were measured in repeated fashion. Additionally, 1 test subject was measured 30 times in 1 day (5 measurements each at 8:00, 9:30, and 11:00 a.m. and at 1:00, 2:30, and 4:00 p.m.). Corresponding measurements were made at 8:00 and 11:00 a.m. and at 4:00 p.m. on 3 separate days to assess repeatability. Grouped data form 18 volunteer subjects were compared to the data of the test subject as well. Pachymetry accuracy on a calibrated standard was determined to be +/- 2 micrometers (standard deviation, n=12). Repeated measures on the subject demonstrated a mean standard deviation of 9.08 micrometers for 750 thickness data points across the central 7 millimeter of the cornea; peripheral measurement points exhibited progressively greater variability than at the apex (analysis of variance; P less than 0.0001). A plot of thickness by corneal location and time of day exhibited a diurnal pattern, with the peripheral cornea exhibiting progressively greater thickness changes than the central cornea (two-way analysis of variance; P less than 0.00001). The data significantly correlated across days when all times of day were considered (r=0.999). However, thickness values obtained at 8:00 a.m. were significaltly different across days (t test; P less than 0.0002). The subject's data correlated very well (r=0.996) with the grouped volunteer data. These data show this system to be useful in corneal research and in clinical settings. The data confirm early morning pachymetry to be highly variable. Additionally, the data not only indicate a diurnal variation of corneal hydration over time, but also imply the presence of a diurnal-based hydration gradient across the peripheral cornea, both of which can have significance for PRK, since excimer tissue ablation effectiveness is influenced by tissue hydration.
DTIC
Cornea; Diurnal Variations; Eye (Anatomy); Optical Measuring Instruments; Tissues (Biology)

20000101082 Helsinki Univ. of Technology, Applied Electronics Lab., Espoo, Finland
Magnetic Resonance Imaging Methods for Improvement of Tissue Contrast Especially Applicable at Low Magnetic Fields
Tanttu, Jukka, Helsinki Univ. of Technology, Finland; 1999; ISSN 1456-1174; 94p; In English
Report No.(s): PB2000-102682; ISBN 951-22-4793-3; Copyright; Avail: National Technical Information Service (NTIS)

The purpose of this study was to develop Magnetic Resonance (MR) imaging methods with improved tissue contrast capabilities applicable at low magnetic field (B (sub 0) less than or equal to 0.1 T), and to demonstrate the clinical feasibility of the methods. The main goals were: 1. to develop a chemical shift method that is applicable at low field range. to combine this method with the Tl measurement to obtain reliable information regarding relaxation times of tissue containing both fat and water. 2. to apply the Tlrho dispersion imaging technique to diseased muscle. The viewing of the dispersion combined with a normal magnitude image would help in lesion detection and the quantitative despersion values could provide information for tissue

characterization. 3. To develop spin lock imaging methods, which are suitable for multiple slice imaging, and to apply these techniques to the differentiation of hepatic haemangiomas and metastases. 4. to develop a pulsed, interleaved MT method based on a 2D imaging sequence. to demonstrate this method in imaging of the human leg. 5. to study the potential improvement of contrast by combining MT and paramagnetic contrast agents. to assess the contrast of brain lesions with an MT-weighted 3D volume imaging method.
NTIS
Imaging Techniques; Magnetic Fields; Magnetic Resonance; Tissues (Biology); Image Contrast

20000101087 NASA Johnson Space Center, Houston, TX USA
GCR Transport in the Brain: Assessment of Self-Shielding, Columnar Damage, and Nuclear Reactions on Cell Inactivation Rates
Shavers, M. R., Baylor Coll. of Medicine, USA; Atwell, W., Boeing North American, Inc., USA; Cucinotta, F. A., NASA Johnson Space Center, USA; [1999]; 4p; In English; 10th; 10th Annual Space Radiation Health Investigator's Workshop, 12-16 Jun. 1999, Upton, NY, USA
Contract(s)/Grant(s): NAS9-2000; No Copyright; Avail: Issuing Activity; Abstract Only

Radiation shield design is driven by the need to limit radiation risks while optimizing risk reduction with launch mass/expense penalties. Both limitation and optimization objectives require the development of accurate and complete means for evaluating the effectiveness of various shield materials and body-self shielding. For galactic cosmic rays (GCR), biophysical response models indicate that track structure effects lead to substantially different assessments of shielding effectiveness relative to assessments based on LET-dependent quality factors. Methods for assessing risk to the central nervous system (CNS) from heavy ions are poorly understood at this time. High-energy and charge (HZE) ion can produce tissue events resulting in damage to clusters of cells in a columnar fashion, especially for stopping heavy ions. Grahn (1973) and Todd (1986) have discussed a microlesion concept or model of stochastic tissue events in analyzing damage from HZE's. Some tissues, including the CNS, maybe sensitive to microlesion's or stochastic tissue events in a manner not illuminated by either conventional dosimetry or fluence-based risk factors. HZE ions may also produce important lateral damage to adjacent cells. Fluences of high-energy proton and alpha particles in the GCR are many times higher than HZE ions. Behind spacecraft and body self-shielding the ratio of protons, alpha particles, and neutrons to HZE ions increases several-fold from free-space values. Models of GCR damage behind shielding have placed large concern on the role of target fragments produced from tissue atoms. The self-shielding of the brain reduces the number of heavy ions reaching the interior regions by a large amount and the remaining light particle environment (protons, neutrons, deuterons. and alpha particles) may be the greatest concern. Tracks of high-energy proton produce nuclear reactions in tissue, which can deposit doses of more than 1 Gv within 5 - 10 cell layers. Information on rates of cell killing from GCR, including patterns of cell killing from single particle tracks. can provide useful information on expected differences between proton and HZE tracks and clinical experiences with photon irradiation. to model effects on cells in the brain, it is important that transport models accurately describe changes in the GCR due to interactions in the cranium and proximate tissues. We describe calculations of the attenuated GCR particle fluxes at three dose-points in the brain and associated patterns of cell killing using biophysical models. The effects of the brain self-shielding and bone-tissue interface of the skull in modulating the GCR environment are considered. For each brain dose-point, the mass distribution in the surrounding 4(pi) solid angle is characterized using the CAM model to trace 512 rays. The CAM model describes the self-shielding by converting the tissue distribution to mass-equivalent aluminum, and nominal values of spacecraft shielding is considered. Particle transport is performed with the proton, neutron, and heavy-ion transport code HZETRN with the nuclear fragmentation model QMSFRG. The distribution of cells killed along the path of individual GCR ions is modeled using in vitro cell inactivation data for cells with varying sensitivity. Monte Carlo simulations of arrays of inactivated cells are considered for protons and heavy ions and used to describe the absolute number of cell killing events of various magnitude in the brain from the GCR. Included are simulations of positions of inactivated cells from stopping heavy ions and nuclear stars produced by high-energy ions most importantly, protons and neutrons.
Author
Biophysics; Bones; Brain; Central Nervous System; Damage Assessment; Dosage; Dosimeters; Nuclear Models; Nuclear Reactions; Radiation Shielding

20000102313 Charles R. Drew Univ. of Medicine and Science, Los Angeles, CA USA
Characterization of the Mechanisms of IGF-I-Mediated Stress-Activated Progein Kinase Activation in Human Breast Cancer Cell MCF-7 *Annual Report, 1 Jul. 1998 - 30 Jun. 1999*
Liu, Wei; Jul. 1999; 13p; In English
Contract(s)/Grant(s): DAMD17-98-1-8066
Report No.(s): AD-A381231; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Insulin-like growth factors (IGFs) have been shown to stimulate cell proliferation and differentiation. and IGF-I, one of the important members of the IGF family plays an important role in the mitogenesis of breast cancer. IGF-I stimulates cell division by modulating events that occur during the early G1 phase. Cell proliferation and activation of oncogenes in cancer cells has been shown to be involved in the modulation of signal transduction pathways. The most important signal transduction pathways in mammalian cells are MAPK pathways, which include ERKl/ERK2, JNK and p38 pathways. These kinases are activated by growth factors and also under stress conditions. Amino acid starvation in cell lines can be used as an experimental model for stress, which can mimic the pathophysiological condition that results from protein deprivation during cancer cachexia. Therefore, we hypothesize that signal transduction pathways in human breast cancer are involved in IGF-I-mediated cellular proliferation under amino acid starvation conditions. Therefore, the specific aim of this study was designated to test the hypothesis that: The signal transduction pathways in human breast cancer involve activation of MAPK (ERKl/ERK2) and JNK pathways.
DTIC
Cancer; Mammary Glands; Genetics; Insulin; Stress (Physiology); Cell Division; Growth

20000102419 Samaritan Health System, Phoenix, AZ USA
Adventures in Space Medicine
Billica, Roger D., Samaritan Health System, USA; [1999]; 1p; In English; 1999 Medical Update Program, 24 Sep. 1999, Phoenix, AZ, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Human space flight experience has demonstrated a variety of hazards and risks to health and performance. In developing ways to help respond to these issues, the field of space medicine has developed a comprehensive program of space flight health risk management that has resulted in positive contributions to medicine and society in general. Examples include accelerated focus on critical health issues such as aging and osteoporosis, and development of new technologies such as non-invasive diagnostic testing for diabetics. The role of health care professionals in human space exploration represents a fulfillment of new adventures and expanding frontiers.
Author
Aerospace Medicine; Space Exploration

20000103954 Catholic Univ. of America, Washington, DC USA
Improving Clinical Diagnosis through Change Detection in Mammography Sequences *Annual Report, 1 Sep. 1998 - 31 Aug. 1999*
Wang, Yue–Joseph; Sep. 1999; 22p; In English
Contract(s)/Grant(s): DAMD17-98-1-8045
Report No.(s): AD-A381158; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In computer-aided diagnosis, temporal change overtime can be a key piece of information in treatment monitoring and disease tracking applications. In these applications, change detection depends on the ability to align the images of the sequence to a common axis, and the ability to build up memory about the image scene overtime. The process of aligning images to a common axis is termed image registration. The image scene representation is called site model. In this research we developed a novel registration technique to align temporal sequences of the same patient that will facilitate the construction of scene memory or site model with the ultimate goal of performing change detection. We have developed a statistical model supported approach for enhanced segmentation and extraction of suspicious mass areas from mammographic images. With an appropriate statistical description of various discriminate characteristics of both true and false candidates from the localized areas, an improved mass detection may be achieved in computer-aided diagnosis. In this study, one type of morphological operation is derived to enhance disease patterns of suspected masses by cleaning up unrelated background clutters, and a model-based image segmentation is performed to localize the suspected mass areas using stochastic relaxation labeling scheme.
DTIC
Computer Techniques; Diagnosis; Stochastic Processes; Morphology; Mammary Glands; Clinical Medicine; Imaging Techniques

20000104205 John B. Pierce Foundation of Connecticut, New Haven, CT USA
Hormonal Contraception, Body Water Balance and Thermoreregulation *Annual Report, 15 Sep. 1998 - 14 Sep. 1999*
Stachenfeld, Nina; Oct. 1999; 89p; In English
Contract(s)/Grant(s): DAMD17-96-C-6093
Report No.(s): AD-A381174; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

To test the hypothesis that estrogen enhances water and sodium retention, we compared the fluid regulatory responses to 150 min of exercise-induced dehydration, followed by 180 min of ad libitum drinking during the follicular and luteal phases of the

menstrual cycle, and following treatment with an estrogen/progestin (OC E+P) and a progestin-only (OC P) oral contraceptive in a double-blind, randomized, cross-over design. We found a downward shift in osmotic regulation of arginine vasopressin (AVP) during the luteal phase and OC E+P compared to the follicular phase during exercise, which was not accompanied by plasma volume expansion or fluid retention. Overall fluid and electrolyte balance was similar across all trials. We also determined that the variability of the fluid regulatory hormones (renin, aldosterone and atrial natriuretic peptide) was high over the course of two menstrual cycles, but slopes and intercepts defining osmotic regulation of AVP were highly reliable. We also determined the estrogen and progesterone on thermoregulation. We found that OC P increased core temperature and delayed the onset of sweating during exercise, but that OC E+ blocks these effects. This indicates that estrogen blocks the progestin-related changes in thermoregulation while on oral contraceptives. We also found that all of these effects were independent of changes in plasma volume. We have begun testing the impact of OC P and OC E+P on osmotic regulation of AVP during hypertonic saline infusion, but have completed only three subjects so have no comment at this point.
DTIC
Thermoregulation; Dehydration; Temperature Control; Hormones; Menstruation; Estrogens

20000104232 NASA Ames Research Center, Moffett Field, CA USA
Vascular Uptake of Six Rehydration Drinks at Rest and Exercise
Greenleaf, J. E., NASA Ames Research Center, USA; Geelen, G., NASA Ames Research Center, USA; Jackson, C. G. R., NASA Ames Research Center, USA; Saumet, J.–L., NASA Ames Research Center, USA; Juhos, L. T., NASA Ames Research Center, USA; Keil, L. C., NASA Ames Research Center, USA; Fegan–Meyer, D., NASA Ames Research Center, USA; Dearborn, A., NASA Ames Research Center, USA; Hinghofer–Szalkay, H., NASA Ames Research Center, USA; Whittam, J. H., Shaklee, Inc., USA; NASA Tech Briefs; August 1996; Volume 20, pp. 116; In English
Report No.(s): ARC-13390; No Copyright; Avail: Issuing Activity; Abstract Only

A report presents data on the effectiveness of each of six rehydration fluids in restoring total body water and plasma volume in human subjects during rest and exercise. One of the six fluids was water sweetened with aspartame: the others were water containing various amounts of sodium chloride and/or sodium citrate, plus various amounts of aspartame and/or other carbohydrates. In one experiment, five men who had previously dehydrated themselves for 24 hours drank one of the rehydration fluids, then sat for 70 minutes. Pretest plasma volumes were measured and changes in plasma volumes were calculated. This procedure was repeated at weekly intervals until all six rehydration fluids had been tested. Another similar experiment involved four men who exercised on a cycle ergometer for 70 minutes in the supine position after drinking the fluids.
Author
Cardiovascular System; Dehydration; Body Fluids; Physical Exercise; Hydration; Carbohydrates; Citrates

20000104233 NASA Johnson Space Center, Houston, TX USA
Temperature Regulation in Crewmembers After a 115-Day Space Flight
Lee, S. M. C.; Williams, W. J.; Siconolfi, S. F.; Gonzalez, R.; Greenleaf, J. E.; Mikhavlov, V.; Kobzev, Y.; Fortney, S. M.; FASEB Journal; 1996; Volume 10, pp. A573; In English
Contract(s)/Grant(s): NAS9-18492; Copyright; Avail: Issuing Activity; Abstract Only

Impaired thermoregulation, which has been observed during exercise following bed rest, may significantly impact crewmembers during space flight operations by decreasing exercise capacity and orthostatic tolerance. Impaired temperature regulation would cause higher levels of core temperature, due to an attenuated cutaneous vasodilatory reflex and sweating response, for a given oxygen consumption. Two mate crewmembers of the Mir 18 mission performed supine cycle exercise se (20 min @ 40% and 20 min @ 65% preflight VO2pk) 145 days preflight and 5 days postflight. Core temperature (Tcore) was measured by an ingestible telemetry pill, skin blood flow (SBF) by laser Doppler velocimetry, and sweat rate (SR) by dew point hygrometry. Tcore at the time of test termination was similar (37.8 C) for both subjects before and after flight despite a shorter test duration (40 vs 28-29 minutes) postflight. The slopes of the SBF/Tcore relationship (Subj 1: 396 vs 214; Subj 2: 704 vs 143 Perfusion Unit/degC) and SR/Tcore relationship (Subj 1: 4.5 vs 2.1; Subj 2: 11.0 vs 3.6mg/min/sq cm/degC) were reduced postflight. Tcore thresholds for both SR (Subj 1: 37.4 vs 37.6; Subj 2: 37.6 vs 37.6 C) and SBF (Subj 1: 37.3 vs 37.5; Subj 2: 37.6 vs 37.7 C) were similar pre- to postflight. For these 2 crewmembers, it appeared that thermoregulation during exercise was impaired as evidenced by compromised heat loss responses after long-duration space flight.
Author
Thermoregulation; Flight Crews; Oxygen Consumption; Perspiration; Orthostatic Tolerance

20000104234 NASA Ames Research Center, Moffett Field, CA USA
Hypovolemia During Early Exposure to 2,800 m Altitude: Effect of Rehydration
Greenleaf, J. E.; Farrell, P. A.; Loomis, J. L.; Fedele, M.; West, J.; Roessler, A.; Hinghofer–Szalkay, H.; FASEB Journal; 1997; Volume 11, pp. A293; In English
Contract(s)/Grant(s): 1996; Copyright; Avail: Issuing Activity; Abstract Only

The mechanism for reduction of total body water and plasma volume (PV) during initial exposure to acute attitude (ALT) is not clear. Ten man (25+/-SD 3yr. 1.99+/-0.l9sq m) were confined (sitting) for 12 hr in a chamber a 2800m ALT or at 305m(ground). They ate a controlled breakfast (450 kcal + 3ml/kg H2O) on the ground, and lunch and dinner at ALT for a total daily intake of 2,850 kcal (14%PRO, 67%CHO, 16%FAT, 26gNaCl). At hr 10 they consumed fluid-electrolyte drinks or water (12ml/kg, 948ml/day) with sessions at weekly intervals: (a) 185mEq/L Na, 283mOsm/kg; (b) 21.6Na, 365mOsm: and (c) water at ALT: and (d) water on the ground. After 10 hr at ALT%(Delta)PV(Hb-Hct) decreased (Pis less than 0.05) by (a) 9.0+/-SE1.5%, (b) 6.2+/-1.7%, (c) 7.4+/-2.2%. and (d) 9.0+/-2.4%. respectively. After drinking at 1200 hr PV increased by (a) 8.3% (Pis less than 0.05), (b) 2.8% (NS), (c) -0.9% (NS). and (d) by 0.8% (NS). respectively. The ground-induced hypovolemia suggests a confinement rather than an ALT effect. The increase in PV after the NaCL-NaCitrate drink (a) indicates that drink composition is mom important than as Osm for restoring PV in these Conditions.
Author
Hypovolemia; Body Fluids; Hydration; Electrolytes

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BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

20000094533 Wyle Labs., Inc., USA
Logistical Consideration in Computer-Based Screening of Astronaut Applicants
Galarza, Laura, Wyle Labs., Inc., USA; [2000]; 1p; In English, 14-28 May 2000, Houston, TX, USA; Sponsored by Aerospace Medical Association, USA; No Copyright; Avail: Issuing Activity; Abstract Only

This presentation reviews the logistical, ergonomic, and psychometric issues and data related to the development and operational use of a computer-based system for the psychological screening of astronaut applicants. The Behavioral Health and Performance Group (BHPG) at the Johnson Space Center upgraded its astronaut psychological screening and selection procedures for the 1999 astronaut applicants and subsequent astronaut selection cycles. The questionnaires, tests, and inventories were upgraded from a paper-and-pencil system to a computer-based system. Members of the BHPG and a computer programmer designed and developed needed interfaces (screens, buttons, etc.) and programs for the astronaut psychological assessment system. This intranet-based system included the user-friendly computer-based administration of tests, test scoring, generation of reports, the integration of test administration and test output to a single system, and a complete database for past, present, and future selection data. Upon completion of the system development phase, four beta and usability tests were conducted with the newly developed system. The first three tests included 1 to 3 participants each. The final system test was conducted with 23 participants tested simultaneously. Usability and ergonomic data were collected from the system (beta) test participants and from 1999 astronaut applicants who volunteered the information in exchange for anonymity. Beta and usability test data were analyzed to examine operational, ergonomic, programming, test administration and scoring issues related to computer-based testing. Results showed a preference for computer-based testing over paper-and -pencil procedures. The data also reflected specific ergonomic, usability, psychometric, and logistical concerns that should be taken into account in future selection cycles. Conclusion. Psychological, psychometric, human and logistical factors must be examined and considered carefully when developing and using a computer-based system for psychological screening and selection.
Author
Logistics Management; Computer Techniques; Human Factors Engineering; Psychometrics; Astronauts

20000094652 Lockheed Martin Space Operations, Houston, TX USA
Reallusory Viewing: A Study of the Application of Virtual Windows in Hermetic Environments *Final Report*
Staderman, William P., Virginia Polytechnic Inst. and State Univ., USA; Adams, Constance M., Lockheed Martin Space Operations, USA; [1999]; 4p; In English; Environmental Systems, 12-15 Jul. 1999, Denver, CO, USA; Sponsored by Society of Automotive Engineers, Inc., USA
Contract(s)/Grant(s): NAS9-18800
Report No.(s): Rept-1999-01-2138; Copyright; Avail: Issuing Activity

The presence of windows in various building designs (e.g., offices, hospitals, houses, etc.) has been correlated with improved psychological well-being and performance. The application in hermetic environments of "virtual windows", an electronic monitor integrated into the interior environment for viewing external landscapes, is expected to correlate with similar positive effects. In order to properly install virtual windows, the display content and the display characteristics need to be considered.
Author
Virtual Reality; Computerized Simulation; Environment Simulation; Flight Simulation; Motion Simulation; Three Dimensional Models

20000096016 Naval Postgraduate School, Monterey, CA USA
Analysis of Naval Flight Officer Selection, Assignment, and Flight School Completion Among U.S. Naval Academy Graduates
Hafner, Ferdinand G.; Jun. 2000; 102p; In English
Report No.(s): AD-A380636; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

There are three models analyzed in this study. The first two models attempt to determine whether academic rank, military rank, and major are predictive of NFO service selection and NFO assignment. The goal of the third model, which predicts NFO completion, is to determine whether academic and military grades, major, personality, gender, and race predict completion of NFO flight training. Logistic regression is used to analyze the effect of the explanatory variables on the dependent variables. The analysis shows that the first two models are not statistically significant predictors of NFO service selection and NFO service assignment. The NFO completion model displays the most interesting result of all three models. Military quality point rating is a highly significant predictor of completing NFO flight training. For midshipmen who select NFO as their first or second choice, the higher their military grades the more likely an Academy graduate will complete flight officer training. Further research is recommended to determine if military quality point rating is a significant predictor of completing one's initial training in other warfare communities.
DTIC
Personnel Selection; Display Devices; Education; Personality; Ratings; Selection; Navy

20000098511 Assistant Secretary of Defense (Force Management and Personnel), Washington, DC USA
Policies, Procedures, and People: The Initial Selection of US Military Officers
Arabian, Jane M., Assistant Secretary of Defense (Force Management and Personnel), USA; Shelby, Jennifer A., Air Force Academy, USA; Officer Selection; August 2000, pp. 1-1 - 1-7; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

USA military officers come from all walks of life so it follows that the policies and procedures for selecting and training officer candidates were designed with that in mind. There are four primary sources of commissioning. Most officers are commissioned through college Reserve Officer Training Corps (ROTC) programs. ROTC is less regimented than the programs at the second type of commissioning source, the four U.S. military academies -- U.S. Military Academy, U.S. Naval Academy, U.S. Air Force Academy, and U.S. Coast Guard Academy - but has the same goals. Officer Training/Candidate School is a third type of commissioning source and serves as an adjustable "valve" to augment the number of officers commissioned in each Service. Other programs, such as the Air Force's Leader Encouraging Airmen Development (LEAD), also exist and are designed to identify outstanding airmen for possible commissioning opportunities. The fourth source of officer commissioning is the direct commission, reserved for certain professionals (e.g., lawyers, physicians). Regardless of commissioning source, the U.S. military has high physical, academic, and moral character standards for individuals seeking to become a military officer. Rather than identify and select individuals for attributes, skills, and abilities needed at advanced officer grades, the U.S. military practices an "up or out" philosophy wherein the training and selection of officers occurs throughout the course of a career.
Author
Armed Forces (USA); Personnel Selection; Policies; Procedures; Qualifications; Personality

20000098512 Ecole Polytechnique Federale, Swiss Military Coll., Switzerland
ACABO - The Assessment Center for Future Professional Officers in the Swiss Army
Annen, Hubert, Ecole Polytechnique Federale, Switzerland; Officer Selection; August 2000, pp. 2-1 - 2-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

Each future professional officer of the Swiss armed forces has to pass an assessment center even before he starts his studies at the Military College. During this three day procedure his personality characteristics and social behaviour are observed and appraised by several trained assessors/observers. The paper describes the organizational and scientific bases of this procedure,

it explains which behavioural dimensions are used in which exercise and gives an account of the different steps of the assessment process. It ends with a description of the main evaluation results and with an indication of possible trends.
Author
Armed Forces (Foreign); Personnel Selection; Personality; Procedures; Human Performance; Human Relations; Switzerland; Qualifications

20000098513 Defence Centre for Leadership, Psychological Div., Copenhagen, Denmark
Officer Selection in the Danish Armed Forces
Meincke, S., Defence Centre for Leadership, Denmark; Officer Selection; August 2000, pp. 3-1 - 3-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

This paper reviews the psychological part of the present selection process which include intelligence, ability and knowledge tests, a group exercise and interviews by psychologists. The result of the psychological assessment is presented for the selection board. Together with results from tests of physical proficiency and the ratings from the candidates' military service, the selection board will use the psychological report as the basis for the final decision. The results of two studies of the system utility are presented: An investigation of the predictive validity showed that it is possible to forecast the examination result of the officer training with a rather high precision. The investigation showed that it was possible to calculate a prognosis for the examination result from the Officer Academy, where the multiple correlation coefficient with the actual examination result is 0.57 for those, who complete the officers training. Another follow-up study showed that the promotion percent of the officers was rising with increasing psychological assessment.
Author
Personnel Selection; Armed Forces (Foreign); Denmark; Physiological Tests; Intelligence Tests; Abilities

20000098514 Ministry of Defence, Military Psychology Service, Vienna, Austria
The Psychological Selection of Officer Candidates in Austria
Frise, E., Ministry of Defence, Austria; Officer Selection; August 2000, pp. 4-1 - 4-3; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

Austria's psychological officers' selection is an integral part of the selection procedure for officers' training, which lasts for more than a year. During this psychological selection, which takes 22 hours, due to the use of selected stressors and a sleepless night not only intelligence and personality traits can be tested but also (by applying the concept of "Ergo-Psychometry") individual stress resistance.
Author
Austria; Armed Forces (Foreign); Personnel Selection; Psychological Tests; Personality; Intelligence; Abilities; Qualifications

20000098515 Middle East Technical Univ., Dept. of Psychology, Ankara, Turkey
Development of a Personality Test Battery to be Used in Officer Selection in the Turkish Armed Forces
Sumer, H. Canan, Middle East Technical Univ., Turkey; Sumer, Nebi, Middle East Technical Univ., Turkey; Sahin, Nesrin, Middle East Technical Univ., Turkey; Sahin, Nail, Middle East Technical Univ., Turkey; Demirutku, Kursad, Middle East Technical Univ., Turkey; Eroglu, Burcu, Middle East Technical Univ., Turkey; Officer Selection; August 2000, pp. 5-1 - 5-12; In English; See also 20000098510; Copyright Waived; Avail: CASI; A03, Hardcopy

This study is an earlier step in the development of a personality test battery to be used in the selection of officers recruited from outside sources in the Turkish Armed Forces. Prior to this study, five personality dimensions were identified as being relevant for the job military officer. Items tapping into these dimensions, or more specifically tapping into the attributes loading under the identified dimensions were developed. The test battery was piloted on a group of officers (N = 519). Revisions in the items were made based on internal consistency estimates. Exploratory factor analyses following these revisions led to further refinements in the battery, and consequently to identification of 18 subdimensions under the five factors that were considerably consistent. Furthermore, a preliminary test of the five-dimension model of personality was conducted using a confirmatory factor analysis. Limitations of the research as well as the steps to be followed are described.
Author
Armed Forces (Foreign); Personality Tests; Personnel Selection; Turkey; Abilities

20000098517 Military Academy, Dept. of Behavioral Sciences and Leadership, West Point, NY USA
Personality Hardiness as a Predictor of Officer Cadet Leadership Performance
Bartone, P. T., Military Academy, USA; Officer Selection; August 2000, pp. 7-1 - 7-5; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

Future military officers must be highly resilient, resourceful, and quick to adjust in rapidly changing situations. In view of this, the time may be now to reconsider the role of normal personality traits that might influence leader performance. A promising personality dimension in this regard is known as "hardiness". High hardy persons have a strong sense of life and work commitment, a greater belief of control, and more openness to change and challenges in life. The present study examined one class of USA Military Academy cadets over time, testing the power of hardiness and several additional cognitive and personality variables to predict military leadership performance over a four-year period. In regression models predicting Military Development (MD) grades for each of four college years. as well as cumulative MD grades over four years, hardiness proved a strong and consistent predictor of military development grades for these officer cadets. It appears that hardiness -- this pervasive and steady sense of commitment, control, and challenge -- facilitates adaptation and performance in the highly stressful world of West Point Army officer cadets. Evidence from this study suggests that personality hardiness is advantageous for young and future U.S. Army officers. These findings have implications for officer selection and training.
Author
Armed Forces (USA); Personality Tests; Leadership; Performance Prediction; Abilities; Qualifications

20000098518 Middle East Technical Univ., Dept. of Psychology, Ankara, Turkey
A Person-Oriented Job Analysis for Identifying Skills and Personality Attributes to be Assessed in Officer Selection
Sumer, H. Canan, Middle East Technical Univ., Turkey; Sumer, Nebi, Middle East Technical Univ., Turkey; Demirutku, Kursad, Middle East Technical Univ., Turkey; Officer Selection; August 2000, pp. 8-1 - 8-11; In English; See also 20000098510; Copyright Waived; Avail: CASI; A03, Hardcopy

The purpose of the present research was to identify personality constructs to be assessed in the selection of officers in the Turkish Armed Forces using a personality-oriented job analysis approach. Personality-oriented job analytic interviews were conducted both with currently employed and former officers (N = 78). Content-analysis of the interviews led to the identification of a list of attributes presumed to be relevant. The attributes were then rated by a group of officers (N = 447) for relevance and importance. Principal component analysis of the weighted relevance ratings resulted in five personality dimensions as being relevant for the job of an officer: Conscientiousness/Self-Discipline, Military Factor, Self-Confidence, Agreeableness-Extraversion, and Leadership.
Author
Armed Forces (Foreign); Turkey; Personnel Selection; Personality; Abilities; Qualifications; Occupation

20000098519 Army Research Inst., Alexandria, VA USA
Officer Selection in the 21st Century
Rumsey, Michael G., Army Research Inst., USA; Ford, Laura A., Human Resources Research Organization, USA; Campbell, Roy C., Human Resources Research Organization, USA; Campbell, John P., Human Resources Research Organization, USA; Knapp, Deirdre J., Human Resources Research Organization, USA; Walker, Clinton B., Human Resources Research Organization, USA; Officer Selection; August 2000, pp. 9-1 - 9-10; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

A key requirement in designing selection systems is determining the attributes of people that underlie their successful performance on the job of interest. The present paper considers junior officer attributes which may be needed for successful performance in the 21st century. This paper examines the application of a methodology and findings from a project examining future attributes needed for noncommissioned officers. It examines projected future changes in the world and the Army environment and considers how these may affect future officer job demands. It then draws inferences about the implications of these changes for the following attributes: general cognitive ability, integrity, achievement motivation, judgment and decision making, social competence, adaptability, communication ability, emotional stability, and physical fitness. While the available information is judged to support the importance of these attributes for the period 2000-2025, the limitations of such information are emphasized. A more thorough analysis using the approach followed in the noncommissioned officer project (NCO21) is recommended.
Author
Personnel Selection; Armed Forces; Human Performance; Occupation; Abilities; Qualifications; Personality

20000098520 Royal Netherlands Army, Behavioral Sciences Div., The Hague, Netherlands
Changing Job Requirements in Relation to Required Abilities or Personality Traits During a Military Career
Terpstra, J., Royal Netherlands Army, Netherlands; Officer Selection; August 2000, pp. 10-1 - 10-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

I started my military training at the Royal Military Academy in 1966. I have held several officer positions over the years (including those of company commander of an armored infantry battalion). Over all these years I have needed knowledge, experience and skills to perform these jobs properly. In recent years I have been responsible for the psychological selection policy in the Royal Netherlands Army. In that position I was able to assist in the reassessment of the requirements. This was required because conscription in the Netherlands was suspended a few years ago and in addition the focus has shifted from large-scale, high intensity conflicts to smaller operations in which personnel are required to perform new tasks and different conduct is expected from officers. My paper reviews a Dutch exploratory survey by Wassenberg, which entailed interviews with some twenty former military personnel who have held positions as senior managers. The requirements set of senior management were catalogued on the basis of the study. I shall then proceed to deal with the differences in positions held by officers at the middle and lowest level. The requirements for officers at the various levels can be formulated on the basis of this comparison and the resultant differences. In view of the limited time available today, we can discuss them only summarily. My paper will round off with some concluding remarks.
Author
Netherlands; Armed Forces (Foreign); Occupation; Personality; Abilities; Qualifications

20000098521 Ministry of Defence, Manpower Div., Singapore
Research and Theory on the Motivation to Lead: Implications for Officer Selection
Chan, Kim–Yin, Ministry of Defence, Singapore; Ong, Kian Chye, Ministry of Defence, Singapore; Chah, Caroline, Ministry of Defence, Singapore; Officer Selection; August 2000, pp. 11-1 - 11-6; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

An original theoretical framework for understanding the relationship between individual differences and leadership behavior is described in which a new construct called the Motivation to Lead (MTL) is proposed. A study to develop measures and models for understanding this new construct is then reported. The findings are discussed in terms of their implications for officer selection in the military.
Author
Armed Forces; Personnel Selection; Leadership; Motivation; Qualifications

20000098522 German Armed Forces, Offizierbewerberpruefzentrale Personalamt der Bundeswehr, Cologne, Germany
Officer Selection in the Federal Armed Forces of Germany
Birke, Wener, German Armed Forces, Germany; Officer Selection; August 2000, pp. 15-1 - 15-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

After the end of World War II, Germany did not have any armed forces of its own for a period of ten years. Military officer selection, for the most part, still takes place according to principles that were introduced 1955, which had the objective of preventing as much as possible, any misuse of the armed forces. Only the careers of specialist officers, which were introduced much later, are governed by other rules. The first applicants for commissioned service to be tested for aptitude during the establishment of the Federal Armed Forces (FAF) were former officers of the Wehrmacht, whose ability to lead military units was usually beyond any doubt because they had already sufficiently proven their ability during the war. Aptitude tests did not, therefore, initially focus on abilities the candidates needed in order to meet certain performance requirements, but on personality traits, attitudes and motives that had been declared selection criteria for political and moral reasons. by filling in questionnaires and talking to examiners in interviews, applicants had to prove that they were prepared, without any reservations, to uphold the values of the new democratic Constitution and to treat their subordinates as "citizens in uniform". The guidelines for officer selection applicable at that time, incidentally, were reminiscent of the classical educational ideal of "mens sana in corpore sano". It seemed that there was no demand for much more than a sound mind in a healthy body because elites of all kinds had fallen into disrepute due to the Nazi ideology. After the first teams of instructors had been accepted for service, more and more young men without prior military service applied; they had to be tested not only for a democratic attitude, but also for the basic ability to learn and discharge leadership tasks. The aptitude test methods were supplemented accordingly, and repeatedly adapted to the changing requirements during the following years. Nevertheless, the following principles have largely remained unchanged.
Author
Germany; Armed Forces (Foreign); Psychological Tests; Qualifications; Personnel Selection

20000098523 Belgian Armed Forces, Centre for Recruitment and Selection, Brussels, Belgium
The Officer Selection in the Belgian Armed Forces
Devriendt, Y. A., Belgian Armed Forces, Belgium; Officer Selection; August 2000, pp. 16-1 - 16-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

In this paper we will discuss the Belgian Armed Forces Officer Selection System (BAF). First of all we will put the Belgian Armed Forces Selection System in perspective by giving some basic information concerning the levels of selection and the numbers of candidates tested. We will give a brief description of the basic selection procedure and of the different possibilities to become an officer. Furthermore the general purpose of the selection system is discussed. Then we will go trough the officer selection profile that the Armed Forces are looking for. Briefly there is an overview of the non-psychological techniques and we will look in more detail to the psychological selection procedures. At the end, some closing observations are given.
Author
Armed Forces (Foreign); Belgium; Personnel Selection; Psychological Tests; Qualifications

20000098524 Naval Aerospace Medical Research Lab., Pensacola, FL USA
Selection of Officers for US Naval Aviation Training
Williams, Henry P., Naval Aerospace Medical Research Lab., USA; Albert, Amanda O., Naval Aerospace Medical Research Lab., USA; Blower, David J., Naval Aerospace Medical Research Lab., USA; Officer Selection; August 2000, pp. 18-1 - 18-7; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

This paper reviews the process of selecting officers for U.S. naval aviation training and describes one of the principal selection tools, the Aviation Selection Test Battery (ASTB). The 1992 version of the ASTB is a paper-and-pencil test administered to all applicants for naval aviation training. ASTB scores and ground school and flight training performance data were available for 2852 student naval aviators and student naval flight officers, and these data were used to re-assess the validity of the ASTB in predicting student performance. The results indicated that the ASTB remains a valid predictor of ground school and flight training grades, and to a lesser extent, attrition from training. For a small subset of the sample used in these analyses, data from a computer-based performance test (CBPT) were also available. The CBPT required subjects to engage in multi-axis tracking tasks concurrently with other cognitive tasks, such as dichotic listening and working memory tasks. Scores from the ASTB, the CBPT, and grades from ground school were entered into a linear regression upon primary flight training grades. The results showed that the combination of ground school and CBPT scores can be used as a good predictor of performance (R(sup 2) = .33, p <.0001).Althoughtheseresuls will require cross validation, the CBPT shows promise as a new selection tool. The importance of these results is discussed in the context of a recently developed computer-based version of the ASTB.
Author
Aircraft Pilots; Flight Training; Pilot Selection; Military Aviation; Performance Prediction; Qualifications

20000098525 National Defence Headquarters, Director Human Resources Research and Evaluation, Ottawa, Ontario Canada
CAPSS: The Canadian Automated Pilot Selection System
Woycheshin, D. E., National Defence Headquarters, Canada; Officer Selection; August 2000, pp. 19-1 - 19-5; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

The Canadian Automated Pilot Selection System (CAPSS) is a computerized simulator of a single engine light aircraft used in the selection of pilots for the Canadian Forces. This paper describes the characteristics of the CAPSS simulator and the types of data it collects. The development of the CAPSS equation that predicts the probability of success in flying training is discussed and the results of the initial validation and cross-validation are presented. Demographic characteristics of applicants assessed by CAPSS since its introduction in February, 1997, are presented. Finally, some of the strengths and weaknesses of CAPSS are discussed.
Author
Computerized Simulation; Pilot Selection; Flight Simulators; Qualifications; Canada; Armed Forces (Foreign); Military Aviation

20000098526 Metrica, Inc., Senior Research Scientists, San Antonio, TX USA
Difficulties in Accessing a Representative Pilot Force: The Demographic Challenge and Views of Minority Pilot Focus Groups
Barucky, Jerry M., Metrica, Inc., USA; Stone, Brice M., Metrica, Inc., USA; Officer Selection; August 2000, pp. 20-1 - 20-9; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

The USA Air Force has expressed concern about under representation of minority officers in its pilot force. Historically, there have been relatively smaller percentages of African-American and Hispanic officers among Air Force pilots than might be expected from other demographic and educational data. As part of a more general study of demographic trends and their effects on the Air Force personnel system, researchers were tasked to gather information pertaining to minority community attitudes about the military and flying careers. The researchers gathered this information from focus group interview sessions among African-American and Hispanic pilots and pilot trainees and from Air Force Academy and Air Force Reserve Officer Training

Corps (AFROTC) minority recruiters. The responses highlight reasons for the lack of interest in flying careers among the most competitive minority students. They also offer suggestions for enhancing the selection/recruitment and training processes to attract a greater percentage of the highly qualified minority students and allow them to compete successfully for pilot positions. This paper presents a brief summary of that report (Barucky, 1998).
Author
Armed Forces (USA); Aircraft Pilots; Minorities; Occupation; Pilot Selection; Motivation

20000098527 Turkish Air Force Academy, Human Resources Center, Istanbul, Turkey
Officer and Pilot Selection System in Turkish Air Force
Bekmezci, Ilker, Turkish Air Force Academy, Turkey; Officer Selection; August 2000, pp. 21-1 - 21-8; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

In contrast to expectations, with the pace of developing technology, the human factor has become one of the most important elements in the organizations. Especially, in complex systems, like aviation, the human factor is even more critical. The fact that the cause of 80% of flight accidents in the last 40 years is related to human factor underlines the importance of human factor in this area. According to the current laws, the aim of the Turkish Air Force Academy (TAFA) is to produce pilot candidate officers. In other words, all officers are aimed to be trained as pilots. Therefore, the officer selection system and pilot selection system is organized in an integrated way. In order to accomplish this critical mission, Turkish Air Force that has always been conscious of the importance of human factor has already developed a complex and multi-staged selection system for Turkish Air Force Academy. The first step of the system is national university entrance test. The election system also includes medical check-up, physical fitness test, various ability and personality tests, three different interviews. The candidates, who succeed to pass these stages, fly a propeller-training plane for 11 hours. At the end of this training, the successful candidates take basic military training. The candidates achieve to pass all the stages successfully can be a student in the Academy. In this paper, the details of this integrated selection system are introduced and the recent improvements in the system are explained.
Author
Armed Forces (Foreign); Turkey; Pilot Selection; Qualifications; Pilot Training

20000098528 Ukrainian Armed Forces, Research Inst. of Military Medicine, Irpen, Ukraine
Theoretical and Organizational Aspects of Professional and Psychophysiological Selection of Military Servicemen in Armed Forces of Ukraine
Korolev, V. V., Ukrainian Armed Forces, Ukraine; Varus, V. I., Ukrainian Armed Forces, Ukraine; Zhakhovsky, V. N., Ukrainian Armed Forces, Ukraine; Volyansky, A. N., Ukrainian Armed Forces, Ukraine; Officer Selection; August 2000, pp. 22-1 - 22-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

The development of the Armed Forces of Ukraine and transition to the professional basis of recruitment of military units pose the specific demands to psychophysiological and moral-psychological condition of the officers. The process of reforming the Armed Forces of Ukraine, one element of which is the reduction of the number of servicemen while still maintaining adequate defensive capability of the country should be implemented by using the science-based methodology of studying and practical application of the "human factor" concept, its role and place in estimation of fighting capability of military units. Obviously, the further perfection of battle systems and facilities should be connected to psychophysiological provision of training and battle activity of the troops.
Author
Armed Forces (Foreign); Psychophysiology; Ukraine; Pilot Selection; Qualifications

20000098529 Aeronautica Militare Italiana, Centro di Selezione, Rome, Italy
Significance of Metacognitive Variables on Officer Selection
Serusi, Carlo, Aeronautica Militare Italiana, Italy; Autore, Alberto Maria, Arma dei Carabinieri, Italy; Officer Selection; August 2000, pp. 23-1 - 23-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

The events which have occurred on the international geopolitical scene in the last years have determined the need of a change of the principles which the national defense policy were traditionally inspired to. The end of the so-called "cold war" in particular, making an aggression from the East very improbable and consequently breaking up the bonds imposed by the culture of the opposite blocks, enabled the emerging of multiple crisis on a regional and local level in opposition to the regained global safety, In this scene, the new defense concept, which has progressively asserted itself, has abandoned the traditional static nature in favor

of a more dynamic concept, mainly projected out of the national borders and engaged in safe-guarding the stability of international relationships and in the settlement of the ethnical and religious disputes.
Author
Armed Forces; Personnel Selection; Qualifications; Cognitive Psychology; Abilities

20000098530 Royal Air Force Coll., Officer and Aircrew Selection Centre, Cranwell, UK
Officer Qualities
Thompson, Robert W., Royal Air Force Coll., UK; Officer Selection; August 2000, pp. 24-1 - 24-6; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

The qualities of an officer have been analyzed and defined countless times, over many centuries. Probably, there is no single accurate description which can encompass completely these myriad views and opinions. This presentation will be a personal view on officer qualities by a UK officer with 2 five-year experiences in selecting officer cadets and then training then during their initial officer training. Discussion will revolve around the qualities of an officer and will try to differentiate the true, effective leader from those who sometimes wear the trappings of rank without, perhaps. having many real leadership qualities. There is often confusion between Management and Leadership and so the differences between the 2 styles will be briefly analyzed. Listed also for consideration will be the leadership qualities which are regarded as important by 4 separate NATO military academies. Clearly, these lists are for the ideal, generic officer and it is interesting to note the difference in emphasis between the various lists of the different training establishments. The paper will finally move on to officer Selection and highlight some of the qualities, raw or potential, which can be identified and assessed during an officer selection process.
Author
Armed Forces (Foreign); UK; North Atlantic Treaty Organization (NATO); Qualifications; Personnel Selection

20000098531 Royal Air Force, Directorate of Recruiting and Selection, Cranwell, UK
Evolution of Aptitude Testing in the RAF
Bailey, M., Royal Air Force, UK; Officer Selection; August 2000, pp. 25-1 - 25-7; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

This paper outlines the history of the RAF aptitude test system and the changes made to aptitude test development programmes and testing policies which have been driven by technological and psychological advances and the requirements to assess for different specialisations and be cost effective. Consideration is also given to the next generation of aptitude tests.
Author
Aptitude; Pilot Selection; Armed Forces (Foreign); Qualifications; UK; Pilot Training

20000098532 National Defence Coll., Karlstad, Sweden
Swedish Officer Selection
Carlstedt, Leif, National Defence Coll., Sweden; Widen, Henry, National Defence Coll., Sweden; Officer Selection; August 2000, pp. 26-1 - 26-6; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

The use of psychological methods as an aid to officer selection in the Swedish armed forces dates back to the early 1940's. The psychological examinations at that time were heavily influenced by German methods developed in the 1930's with an emphasis on personality variables. In 1996, a new system was introduced, which is based on the theories of Jaques and Stamp and on the philosophy that the first stage of selection must be directed at deselecting applicants not at all suited for the officer profession, rather than trying to find those best suited. The new system has three main components: A cognitive test battery, a personality inventory and an interview. The test battery, comprising three inductive, four spatial and five verbal tests, was constructed with the aid of confirmatory factor analysis. It is evaluated in independent (orthogonal) factor scores over the three latent intelligence factors G (general), Gv (visualization) and Gc (crystallized), as well as in co-varying (oblique) factor scores over the factors inductive, spatial, and verbal intelligence. The personality inventory was also constructed using confirmatory factor analysis. It has 155 statements that yield five independent factors labeled Subjective Leadership Potential, Inflexibility, Adventurousness, Opportunism and Unreliability. The interview is semi-structured and lasts for about 90 minutes. It results in ratings of the six variables Social ability, Motivation for the profession, Emotional stability, Intellectual ability, Energy and Maturity. Construction of criterion instruments is under way, but so far it has not been possible to assess the predictive validity of the instruments due to the fact that criteria have as yet not been available.
Author
Armed Forces (Foreign); Sweden; Qualifications; Personality Tests; Intelligence Tests; Psychological Tests

20000098533 Abertay Univ., Div. of Psychology, Dundee, UK

Metacognitive, Social and Interpersonal Skills and Aptitudes in Officer Performance with Distributed Teams

Cook, Malcolm James, Abertay Univ., UK; Klumper, Willem, Netherlands Defence Coll., Netherlands; Officer Selection; August 2000, pp. 27-1 - 27-14; In English; See also 20000098510; Copyright Waived; Avail: CASI; A03, Hardcopy

Military services, Police, Fire Brigade, Medical Emergency Teams and various other task cohesive groups require supervisory management to ensure that goals are met in a manner which is flexible, reduces risk, is resource economical, and promotes team development. Many of the military and emergency teams require leadership via mediated communication because different elements of the team perform functions in different locations. There is adequate evidence from research on the use of different types of media, with different rules of interaction, with different groups and tasks that performance varies significantly in process and outcome terms between face-to-face and mediated communication variants (Anderson, Newlands, Mullin and Fleming, 1996; Archer, 1990; Christensen and Fjermestad, 1997; El-Shinnawy, and Vinze, 1997; Hollingshead, 1996a, 1996b; Valacich and Schwenk, 1995; Lim and Benbasat , 1997; Reid, Ball, Morley and Evans, 1997), with performance generally poorer in mediated (non face-to-face) situations. Analysis of leadership roles in general clearly indicate the significance of insightful management of relationships among team members and their relation to the outside world (Katzenbach and Smith, 1994). The priorities identified by this very early work is identified in short pocket guides (Fleming, 1996; Hardingham, 1995; Birch, 1999; Heller, 1999) and in more academic reviews (Larson and Lafasto, 1989; Hartley, 1997; Belbin, 1999). The significant issues in leadership are: 1) The management of goal orientation. 2) Building confidence. 3) Managing the resource availability in the team. 4) Articulating performance with other teams. This emphasis on relationships and intelligent asset management (human and material) supports the general tenets of this paper which emphasises the need for metacognitive, social and interpersonal skills in effective leadership. Early research such as that of Stogdill (1974) indicated that leaders tended to be more intelligent, sociable, and achievement oriented (internally motivated by their own standards). This paper recognises the tendency for managers and leaders to be merged into one individual as the downward pressure on military and civil institutions creates flatter management groupings from fewer numbers of individuals. In addition it is acknowledged that both the pace of modern warfare and the need for resistant or robust command and control, results in distributed leadership and management on the battlefield, in the air and at sea.

Author

Cognition; Social Factors; Human Relations; Personnel Selection; Aptitude; Emergencies; Qualifications; Command and Control; Rescue Operations

20000098534 Belgian Air Force, Center for Recruitment and Selection, Brussels, Belgium

Data Integration and Classification for an Officer Selection System

Lescreve, Francois J., Belgian Air Force, Belgium; Officer Selection; August 2000, pp. 28-1 - 28-7; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

This paper focuses on the integration of different selection data in order to select and assign officer applicants. First the problem is defined. Three topics are discussed in more detail: the heterogeneousness of the selection data on hand and the problems this can cause, the integration of selection data in order to estimate the suitability of an individual for a specific officer training and the problem of the allocation of candidates to different vacancies. Next, possible approaches are discussed and finally, the paper comes to some conclusions. These advocate the use of modern multi-criteria and multidimensional classification methods to capitalize on the applicant population to optimize the officer corps quality.

Author

Personnel Selection; Armed Forces; Qualifications; Education; Data Integration; Classifications; Personality

20000098535 French Air Force, Bureau Evaluation, Paris, France

Recruiting and Selection in the French Army

Lagache, Stephane, French Air Force, France; Officer Selection; August 2000, pp. 29-1 - 29-7; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

The international context evolution has involved in a reorganization of our army structures, a tightening of the forces conjointly the end (adjournment) of the conscription. In this period of intense transformation, selection, recruiting and training of officers and non-commissioned officers (NCO) must take into consideration, What we call "refoundation" in the Army infers in the field of human resources an ever-increased claim of performance which is relied on a dynamic management of carriers according to abilities and with the age and recruiting origin. So it matters today to adopt our selection orientation and recruiting

system to respond on these new requirements. Within this framework, the Army first at all aims two main goals defining a new balance between quality demanding and the research of the maintenance of officer's Corp cohesiveness.
Author
Armed Forces (Foreign); France; Personnel Selection; Qualifications; Abilities

20000098536 National Defence Headquarters, Director Human Resources Research and Evaluation, Ottawa, Ontario Canada
The Canadian Forces Officer Selection System
Woycheshin, D. E., National Defence Headquarters, Canada; Officer Selection; August 2000, pp. 30-1 - 30-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

This paper provides a brief overview of the officer selection process for the Canadian Forces. The current size of the Canadian Forces and officer applicant and enrollee statistics for the main enrollment plans are included. The applicant processing sequence is described in general. Applicant attributes assessed in the selection interview and areas used to assign a specific occupation are discussed. Specific selection instruments, including aptitude testing, medical evaluation, the selection interview and fitness testing are described, and the use of these sources of information in the decision process is reviewed. Finally, the Naval Officer Assessment Board and the Air Crew selection procedures are described.
Author
Personnel Selection; Armed Forces (Foreign); Canada; Qualifications; Abilities

20000098537 Dutch Armed Forces, Defense Recruitment and Selection, Amsterdam, Netherlands
Can Psychological Selection be the Same for All Dutch Officers?
Visser, Wim H. M., Dutch Armed Forces, Netherlands; Officer Selection; August 2000, pp. 31-1 - 31-3; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

Since a couple of years there is in the Netherlands one national Defense Selection center. With the exception of pilots all Dutch officers are selected there. In this Selection Center there is a tendency to equalize as far as possible the procedures for the different officer corps, and to differentiate only when there are different requirements in practice. In this reading on the officer selection in the Netherlands the different procedures for four Armed Forces is discussed and the tendency to make them more uniform. First I will give a survey of the officer selection and some background information about the Dutch military forces. Then I will speak about the different phases of the selection process. At first the administrative pre-selection, where the first screening takes place, in which there is decided if the applicant is admitted to the official selection. Next the psychological examination, existing of capability tests, personality questionnaires, and the interview; the medical examination with connecting physical tests; assessment tests for the Corps Marines and for pilots, and finally the Selection Admission Boards. In each phase of the selection procedure I will indicate the differences between the Forces, and explain on which grounds these differences are made.
Author
Armed Forces (Foreign); Netherlands; Personnel Selection; Psychological Tests; Qualifications; Military Psychology

20000098538 Polish Air Force Inst. of Aviation Medicine, Dept. of Psychology, Warsaw, Poland
The Conceptual System of Officer Applicants to Military High Schools from the Air Force, the Navy and the Army in Poland
Truszczynski, O. E., Polish Air Force Inst. of Aviation Medicine, Poland; Terelak, J. F., Polish Air Force Inst. of Aviation Medicine, Poland; Officer Selection; August 2000, pp. 32-1 - 32-4; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

The paper contains the basic information concerning the system of officer applicants to Military High Schools in Poland. It is presented methods of psychological assessment of the applicants and the role of psychologists in the whole recruitment procedures.
Author
Armed Forces (Foreign); Poland; Personnel Selection; Qualifications; Psychological Tests

20000098539 Saville and Holdsworth Ltd., UK R and D Director, Thames Ditton, UK
Technologies for Integrated Assessment and Selection Systems
Burke, Eugene, Saville and Holdsworth Ltd., UK; Officer Selection; August 2000, pp. 33-1 - 33-5; In English; See also 20000098510; Copyright Waived; Avail: CASI; A01, Hardcopy

This paper looks forward from the last NATO review of computer-based assessment (CBA) of military personnel (Burke and Van Raay, 1993; see also Burke, 1993, and Burke et al., 1995). At the time of that report, research and development among NATO nations could be summarized according to three areas of work: (1) Desktop systems delivering traditional tests and questionnaires

as well as more dynamic tasks developed from paradigms from cognitive psychology, using LANs and WANs, and from which the principle gains were the increased reliability and reduced costs from automation of the assessment process. Systems characterizing this approach included those developed by the Royal Air Force (RAF) in the UK for officer and aircrew selection (Burke, 1992, and Burke et al., 1994), Project A in the US, Taskomat in the Netherlands and the ESPACE system in France. (2) Simulation-based assessment (SBA) systems for delivery of sophisticated work sample measures usually administered after prior screening using paper-and-pencil or desktop tests and questionnaires, and developed for selection to high risk/high cost roles such as aircraft pilot. Systems characterising this approach included the CAPSS system in Canada and the GUTS in Belgium, as well as a range of systems developed in Germany. The primary focus of these systems was increased validity and reduced training costs against which the substantial costs of SBA development and administration could be recovered. (3) Adaptive testing systems that sought to exploit capabilities unique to CBA in delivering tailored testing (i.e. measurement geared to an individual's level of ability). The US CAT-ASVAB programme stands as the most substantial work in this area to date. As well as adaptive testing, the late 1980s and early 1990s also saw the advent of item generation techniques in which item engines contained in the test software produce the item or task on-the-fly during a test administration. The UK British Army Recruit Battery (BARB) system was the first item generative system to go live in military assessment, though the same methodology was also used to produce fixed parallel forms of paper-and-pencil tests for the Royal Navy (the ABC test battery).
Author

Computer Techniques; Personnel Selection; Computer Programs; Aircraft Pilots; Qualifications; Psychological Tests

20000098540 Royal Air Force Coll., Officer and Aircrew Selection Centre, Cranwell, UK

The Structured Interview

Thompson, Robert W., Royal Air Force Coll., UK; Officer Selection; August 2000, pp. 12-1 - 12-10; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

"Employee selection is usually a lottery, and interviews are not the best forum for checking the right person". This is a recent claim by a UK firm of recruitment consultants which advocates its own assessment centre as the way ahead for graduate recruitment. Research by another recruitment group, Robert Half International, indicates that it takes only a matter of minutes for the interviewer to decide whether the body on the other side of the desk is the right person for the job. This research indicated that more than 20% of managers who were interviewed claimed that they could make up their minds about a candidate within one to five minutes. A further 45% believed that they were able to sum up a person's suitability in under 15 minutes. If these figures are correct, then clearly the way the candidate walks, dresses and how the body language shapes up for the first handshake can all have a major effect on deciding which way a career and life-changing interview may go. Headhunters and executive search specialists all report that, however well-intentioned, objective and scientific the interview system, there are certain prejudices which can never be eradicated. For instance, for most there is a natural preference for working with good-looking people. Significantly. it is no coincidence that there are disproportionately few good-looking people doing menial jobs. It is current fashion therefore to discredit the interview as a means of selection. However, the Royal Air Force uses a structured interview as an initial assessment procedure and also as a useful filter for candidates seen as less able. Following interview, candidates are graded on a scale of 1 (lowest) to 7 (highest). Statistical analysis of successful officer candidates shows a persuasive correlation between interview grades and the quality of success during officer training. The Royal Air Force is of the firm opinion that the structured interview remains a successful yardstick and tool during officer selection. How is this so? (1) First and foremost. the interviewers, who always have a wealth of general military experience, are formally trained interviewers. The interview Board consists of 2 senior officers. (2) Secondly, the interview is specifically structured and tailored to elicit and accurate picture of the candidate, vis-a-vis his/her suitability for officer training. (3) Following the interview, where there is a difference of opinion, the differences are discussed and a compromise agreement is reached. Where there is no compromise (and this is rare) differences are recorded and then independently reviewed. (4) The interview Boards are subjected to regular standardization checks by an independent board of assessors. Experience has shown that the structured interview carried out by 2 formally trained officers, has a high degree of objectivity. The interview lasts for 45 minutes and all of that time is essential, plus later discussion between Board Members, to formulate an overall opinion and assessment. Within the Royal Air Force Officer and Aircrew Selection Centre, the structured interview remains an integral and accurate method of assessment.
Author

Pilot Selection; Armed Forces (Foreign); UK; Qualifications

20000098541 Royal Military Academy, Dept. of Psychology, Brussels, Belgium

Matching Selection Criteria and Ultimate Vocational Criteria For Officers In The Belgian Armed Forces

Mylle, Jacques, Royal Military Academy, Belgium; Officer Selection; August 2000, pp. 13-1 - 13-7; In English; See also 20000098510; Copyright Waived; Avail: CASI; A02, Hardcopy

Before 1990, the military context of employment was relatively uniform. Dramatic changes since then - a new vision on leadership, and the multiple vacancies for applicant officers - gave raise to the question if differentiation in selection criteria would not be more appropriate than the overall procedure in use, given the (hypothesized) differentiation in ultimate vocational criteria. This question falls apart into two questions: 1) which are those ultimate criteria? and 2) which of them apply to whom and to what extent? In a first step, an inventory of criteria ought relevant was drawn, resulting in a list of 118 criteria. In a second step, factor analysis was used to regroup these criteria on the basis of common latent factors. Six factors were found; corresponding to the "Big Five" of personality and one military factor. In a third step, the relative importance of those criteria was assessed and, finally, discriminant analysis was used to distinguish between "kinds" of officers on the basis of those common factors. These "kinds" refer to three different aspects: the status, the studies done as applicant officer, and the different Services, Specialties, Arms and Type of units.
Author
Armed Forces (Foreign); Belgium; Personnel Selection; Qualifications; Factor Analysis; Criteria

20000099713 Florida Univ., Dept. of Electrical and Computer Engineering, Gainesville, FL USA
Information Theoretic Extraction of EEG Features for Monitoring Subject Attention *Final Report*
Principe, Jose C., Florida Univ., USA; September 2000; 15p; In English
Contract(s)/Grant(s): NAG1-2188; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of this project was to test the applicability of information theoretic learning (feasibility study) to develop new brain computer interfaces (BCI). The difficulty to BCI comes from several aspects: (1) the effective data collection of signals related to cognition; (2) the preprocessing of these signals to extract the relevant information; (3) the pattern recognition methodology to detect reliably the signals related to cognitive states. We only addressed the two last aspects in this research. We started by evaluating an information theoretic measure of distance (Bhattacharyya distance) for BCI performance with good predictive results. We also compared several features to detect the presence of event related desynchronization (ERD) and synchronization (ERS), and concluded that at least for now the bandpass filtering is the best compromise between simplicity and performance. Finally, we implemented several classifiers for temporal - pattern recognition. We found out that the performance of temporal classifiers is superior to static classifiers but not by much. We conclude by stating that the future of BCI should be found in alternate approaches to sense, collect and process the signals created by populations of neurons. Towards this goal, cross-disciplinary teams of neuroscientists and engineers should be funded to approach BCIs from a much more principled view point.
Author
Information Theory; Numerical Analysis; Feasibility Analysis; Brain; Computer Programs; Interfaces; Electroencephalography

20000101043 Naval Postgraduate School, Systems Management Dept., Monterey, CA USA
Emotional Intelligence: A Look at its Effect on Performance at the USA Naval Academy
Hoffman, Stephen L., Naval Postgraduate School, USA; May 1999; 86p; In English
Report No.(s): AD-A368104; No Copyright; Avail: Issuing Activity

This study uses the results from the BarOn Emotional Quotient (EQ) Inventory by a freshman class upon entry to the USA Naval Academy. The data reflects the response of 1,040 students between the ages of 17 and 22. Using BarOn's model, this study focuses on the relationship of EQ to Naval Academy performance measurements such as academics, general performance, and conduct. Attrition and gender relationships to EQ are also analyzed. Few studies have specifically addressed the EQ attributes found in young Naval leaders. In fact, most studies reviewed centered on EQ's influence on children or corporations. Potential Academy areas of interest such as academics, performance, conduct, attrition, and gender were examined in light of BarOn's five basic EQ components of Interpersonal, Intrapersonal, Adaptability, Stress Management, and General Mood and their relative subscales. Overall, BarOn's EQ components were able to show significant relationships of EQ to performance, conduct, attrition, and gender. It is recommended that the Naval Academy include the EQ construct in one of its standard leadership classes; and that the freshmen class who took the test be allowed to retake the test during their senior year to provide longitudinal research.
DTIC
Emotional Factors; Mental Performance; Navy; Intellect

20000102473 Advancetek, Inc., Indianapolis, IN USA
Actigraph and Sleep Data Analysis *Final Report, 15 May 1998 - 14 Feb. 1999*
Eberhart, Russell C., Advancetek, Inc., USA; April 1999; 17p; In English
Contract(s)/Grant(s): DAMD17-98-C-8035
Report No.(s): AD-A366952; No Copyright; Avail: Defense Technical Information Center (DTIC)

The primary goal of Phase I of this contract is to develop a software analysis tool that classifies a subject as asleep or awake from actigraph data. Neural network tools that achieve a testing accuracy of 93-95 percent have been developed using particle swarm optimization.
DTIC
Sleep; Data Processing

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human factors engineering; bionics, man-machine, life support, space suits and protective clothing. For related information see also 16 Space Transportation and 52 Aerospace Medicine..

20000094525 NASA Johnson Space Center, Houston, TX USA
Toxicological Assessment of the International Space Station Atmosphere
James, John T., NASA Johnson Space Center, USA; Limero, T., Wyle Labs., Inc., USA; Beck, S., Wyle Labs., Inc., USA; Yang, L., Wyle Labs., Inc., USA; Martin, M., Wyle Labs., Inc., USA; Covington, P., Wyle Labs., Inc., USA; Boyd, J., Wyle Labs., Inc., USA; Lind, D., Wyle Labs., Inc., USA; [2000]; 1p; In English; Environmental Systems, 10-13 Jul. 2000, Toulouse, France; Sponsored by Dornier Satellitensysteme G.m.b.H., Germany; No Copyright; Avail: Issuing Activity; Abstract Only

Space-faring crews must have safe breathing air throughout their missions to ensure adequate performance and good health. Toxicological assessment of air quality depends on the standards that define acceptable air quality, measurements of pollutant levels during the flight, and reports from the crew on their in-flight perceptions of air quality. Air samples from ISS flight 2A showed that contaminants in the Zarya module were at higher concentrations than the Unity module. At the crew's first entry, the amount of non-methane volatile organic compounds (NMVOCs) in Zarya was 23 Mg/cubic meter, whereas in the amount of NMVOCs in Unity was 5.3 mg/cubic meter. Approximately 26 hours later at egress from the modules, the NMVOCs were comparable indicating good mixing of the atmospheres. The 2A crew reported no adverse health effects related to air pollution during their flight. Ingress air samples from 2A.1, which was flown more than 5 months after 2A, again showed that the Zarya had accumulated more unscrubbed pollutants than Unity. The NMVOCs in Unity were 3.5 mg/cubic meter, whereas the were 20 mg/cubic meter in Zarya. After almost 80 hours of ISS operations, the NMVOCs were 7.5 and 12 mg/cubic meter in Unity and Zarya, respectively. This suggests that the atmospheres in the modules were not mixing very well. The 2A.1 crew felt that the air quality in Zarya deteriorated when they were working in a group at close quarters, when the panels had been removed, and after they had worked in an area for some time. The weight of evidence suggests that human metabolic products (carbon dioxide, water vapor, heat) were not being effectively removed from the crew's work area, and these caused their symptoms. Additional local measurements of pollutants are planned for the 2A.2 mission to the ISS.
Author
Air Quality; Carbon Dioxide; International Space Station; Spacecraft Environments; Exobiology

20000094675 NASA Marshall Space Flight Center, Huntsville, AL USA
Nutritional Support
Smith, Scott M., NASA Marshall Space Flight Center, USA; Lane, Helen W., NASA Marshall Space Flight Center, USA; [2000]; 48p; In English; Copyright; Avail: Issuing Activity

Adequate nutritional status is critical for maintenance of crew health during extended- duration space flight and postflight rehabilitation. Nutrition issues relate to intake of required nutrients, physiological adaptation to weightlessness, psychological adaptation to extreme environments, and countermeasures to ameliorate the negative effects of space flight. Thus, defining the nutrient requirements for space flight and ensuring provision and intake of those nutrients are critical issues for crew health and mission success. Specialized nutritional requirements have only been considered for what are referred to here as extended-duration flights, i.e., those greater than 30 days in length. While adequate nutrition is important on the 1- to 3-week Shuttle flights, intakes of specific nutrients above or below space specific requirements for this period will not produce cause for concern. Thus, Shuttle flights have always used the recognized nutritional requirements for adult men and women. In this chapter, long-duration flights will be further differentiated into orbital missions (e.g., International Space Station) and interplanetary exploration missions.
Author
Nutritional Requirements; Aerospace Medicine; Health; Human Beings; Long Duration Space Flight; Physiological Responses

20000095480 New Energy and Industrial Technology Development Organization, Tokyo, Japan

Fiscal 1997 report on the results of the international standardization R and D: International standards for computers/manikins

Mar. 31, 1998; 221p; In Japanese; In English

Report No.(s): DE99-726022; ETDE/JP-99726022; No Copyright; Avail: Department of Energy Information Bridge

Through the development of computer manikins (CM) which assess human adaptability to products and environments, a draft for international standardization was worked out to propose to ISO. A draft for the international standardization was presented to ISO through a development of 'a structure model' changing based on human attributes, a study of 'a motion model' enabling changes in posture and movement, a study of 'an evaluation model' evaluating attainment ranges and ecodynamic loads, and a development of 'computer functions' realizing the above-mentioned functions. The development of CM having the following characteristics: a function to reproduce 'the structure model' based on the ISO7250 human body dimensional measuring values which were regulated in items for the human body dimensional measuring, a function to change posture/movement based on the joint movable range data, a function to evaluate geometrical human adaptability such as attainment ranges. As a plug-in to Autodesk Mechanical Desktop 2.0, the above-mentioned functions were realized, and the modular structure platform was constructed which enables the wide-range cross-industry option and functional expansion by the advance of CM.

NTIS

Standardization; Adaptation; Computers; Computer Aided Design; Human Factors Engineering; Human-Computer Interface

20000096492 NASA Johnson Space Center, Houston, TX USA

Critical Path Web Site

Robinson, Judith L., NASA Johnson Space Center, USA; Charles, John B., NASA Johnson Space Center, USA; [2000]; 1p; In English

Contract(s)/Grant(s): NAS9-97166; No Copyright; Avail: Issuing Activity; Abstract Only

Approximately three years ago, the Agency's lead center for the human elements of spaceflight (the Johnson Space Center), along with the National Biomedical Research Institute (NSBRI) (which has the lead role in developing countermeasures) initiated an activity to identify the most critical risks confronting extended human spaceflight. Two salient factors influenced this activity: first, what information is needed to enable a "go/no go" decision to embark on extended human spaceflight missions; and second, what knowledge and capabilities are needed to address known and potential health, safety and performance risks associated with such missions. A unique approach was used to first define and assess those risks, and then to prioritize them. This activity was called the Critical Path Roadmap (CPR) and it represents an opportunity to develop and implement a focused and evolving program of research and technology designed from a "risk reduction" perspective to prevent or minimize the risks to humans exposed to the space environment. The Critical Path Roadmap provides the foundation needed to ensure that human spaceflight, now and in the future, is as safe, productive and healthy as possible (within the constraints imposed on any particular mission) regardless of mission duration or destination. As a tool, the Critical Path Roadmap enables the decision maker to select from among the demonstrated or potential risks those that are to be mitigated, and the completeness of that mitigation. The primary audience for the CPR Web Site is the members of the scientific community who are interested in the research and technology efforts required for ensuring safe and productive human spaceflight. They may already be informed about the various space life sciences research programs or they may be newcomers. Providing the CPR content to potential investigators increases the probability of their delivering effective risk mitigations. Others who will use the CPR Web Site and its content include program managers and administrators who track the program and are involved in decisions regarding resource allocation and program evaluation.

Author

World Wide Web; Manned Space Flight; Flight Safety; Aerospace Environments

20000096524 NASA Johnson Space Center, Houston, TX USA

Space Human Factors Engineering Challenges in Long Duration Space Flight

Garland, Daniel J., SA Technologies, USA; Endsley, Mica R., SA Technologies, USA; Ellison, June, NASA, USA; Caldwell, Barrett S., Wisconsin Univ., USA; Mount, Frances E., NASA Johnson Space Center, USA; [1999]; 2p; In English; Human Factors Engineering Challenges in Long Duration Space Flight, 27 Sep. - 1 Oct. 1999, Houston, TX, USA; Sponsored by Human Factors and Ergonomics Society, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The focus of this panel is on identifying and discussing the critical human factors challenges facing long duration space flight. Living and working aboard the International Space Station (ISS) will build on the experience humans have had to date aboard

the Shuttle and MIR. More extended missions, involving lunar and planetary missions to Mars are being planned. These missions will involve many human factors challenges regarding a number of issues on which more research is needed.
Author
Human Factors Engineering; International Space Station; Long Duration Space Flight; Manned Space Flight

20000097968 NASA Johnson Space Center, Houston, TX USA
International Space Station ECLSS Operations Status - Increment 0A
Lamczyk, Philip C., NASA Johnson Space Center, USA; 1998; 13p; In English; 29th; Environmental Systems, Denver, CO, USA; Sponsored by Society of Automotive Engineers, Inc., USA
Contract(s)/Grant(s): NAS9-20000
Report No.(s): Paper-1999-01-2145; Copyright; Avail: Issuing Activity

This paper describes Environmental Control and Life Support Systems (ECLSS) operations to date for preflight planning, international partner coordination and mission plan execution of the International Space Station (ISS). The focus is on the activities involved with the STS-88(2A) Space Shuttle Endeavor flight, the first delivery of the US segment of the ISS, which consists of the Pressurized Mating Adapter (PMA)/and Node 1 elements, and the delivery of the first Russian segment of the ISS, the FGB, a US-financed and Russian- built module.
Author
Life Support Systems; Environmental Control; Bonding; Adapters

20000101072 NASA Johnson Space Center, Houston, TX USA
Quantification and Characterization of Volatiles Evolved During Extrusion of Rice and Soy Flours
Zasypkin, D., NASA Johnson Space Center, USA; Lertsiriyothin, W., NASA Johnson Space Center, USA; Lee, T. C., NASA Johnson Space Center, USA; Bourland, C. T., NASA Johnson Space Center, USA; [1999]; 1p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

NASA Johnson Space Center is designing and building a habitat (Bioregenerative Planetary Life Support Systems Test Complex, BIO-Plex) intended for evaluating advanced life support systems developed for long duration missions to the Moon or Mars where all consumables will be recycled and reused. A food system based on raw products obtained from higher plants (such as soybeans, rice and wheat) may be a central feature of a biological ly-based Advanced Life Support System (ALSS). In order to convert raw crops to edible ingredients or food items, multipurpose processing equipment such as an extruder is ideal. Volatile compounds evolved during the manufacturing of these food products may accumulate reaching toxic levels. Additionally, off-odors often dissipated in open-air environments without consequence, may cause significant discomfort in the BIO-Plex. Rice and defatted soy flours were adjusted to 16% moisture and triplicate samples were extruded using a table top single-screw extruder. The extrudate was collected in specially designed Tedlar bags from which air samples could be extracted. The samples were analyzed by GC-MS with special emphasis on compounds with Spacecraft Maximum Allowable Concentrations (SMAC). Results showed a combination of alcohols, aldehydes, ketones and carbonyl compounds in the different flours. Each compound and its SMAC value as well as its impact on the air revitalization system was discussed.
Author
Life Support Systems; Regeneration (Engineering); Design Analysis; Fabrication; Air Purification; Closed Ecological Systems; Manufacturing

20000102393 Lockheed Martin Space Operations, Space Habitation Design Group, Houston, TX USA
The Role of Habitability Studies in Space Facility and Vehicle Design
Adams, Constance M., Lockheed Martin Space Operations, USA; [1999]; 17p; In English, 28 May 1999, Houston, TX, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): NAS9-18800; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document is a viewgraph presentation which reviews the role of the space architect in designing a space vehicle with habitability as a chief concern. Habitability is composed of the qualities of the environment or system which support the crew in working and living. All the impacts from habitability are interdependent; i.e., impacts to well-being can impact performance, safety or efficiency. After reviewing the issues relating to habitability the presentation discusses the application of these issues in two case studies. The first studies the Bio-Plex Hab chamber which includes designs of the living and working areas. The second case study is the ISS-TransHab which is being studied as a prototype for Mars transit.
CASI
Architecture; Habitability; Space Habitats; Aerospace Environments; Human Factors Engineering; Spacecraft Environments

20000104668 Sytronics, Inc., Dayton, OH USA

An Evaluation of Pilot Uplook for a U.S. Air Force and U.S. Navy Helmet-mounted Cueing System *Final Report, Oct. 1995-Dec. 1996*

Blackwell, Sherri U.; Brill, Tina R.; Zehner, Gregory F.; Krauskopf, Philip J.; Robbins, Glenn C.; Sep. 1997; 41p; In English; Prepared in collaboration with Air Force Research Lab., Wright-Patterson, OH, and Dayton Univ., Dayton, OH.

Contract(s)/Grant(s): F41624-93-C-6001; AF Proj. 7184

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The goal of the Uplook Angle Study was to determine human limitations in head and neck range of motion in the vertical plane while seated in a variety of ejection seats, and while wearing different ensembles of protective equipment. Although some information on range of motion of the neck is available in the literature, none are relevant to the encumbered and high-G conditions that fighter pilots encounter. Data from the study will serve as input into a joint service system which will enhance aircraft lethality and survivability by reducing the amount of time aircrews need to acquire targets. Information from helmet-mounted sights and weapons systems will be projected to small displays near the eye, allowing aircrews to react quickly, especially in high threat environments. Pilots will be able to aim weapons by simply moving their heads and designating the target. The system will also display a variety of other information about sensors, targets, and aircraft status, which will enable pilots to stay "eyes out of the cockpit" as much as possible; greatly enhancing their visual search capability and overall situation awareness.
DTIC

Helmet Mounted Displays; Human Factors Engineering; Weapon Systems; Flight Crews; Cues

Subject Terms Index

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